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HEREDITARY DISEASES.

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In dealing with this extensive subject, it is not my intention to give a long list of diseases which are hereditary—indeed, my knowledge of pathology would not permit it; but to note a few general principles, so that we may have a definite idea as to what constitutes a predisposition to, or an hereditary disease.

That hereditary laws have been recognised as an important factor of disease for thousands of years, we have only to refer to the passage in the Decalogue, which declares that the iniquities of the fathers are visited upon the children, even to the third and fourth generation. This is a concise statement of the operations of a physiological law which holds good in the lower animals as truly as in man. The physical and mental infirmities of the sire and dam are often transmitted, even beyond the third and fourth generation.

An hereditary disease is one in which the disease or tendency to the disease existed in one or more of the ancestors. And before going further it would be well to review a few of the important laws of heredity dealing with this question. All are aware of the old law that "like begets like," and of the value of pedigree. Animals in a state of nature are in every sense of the term "pure bred," for they breed true every time, and breeding with such animals would be less a game of chance. We endeavour with our stud and herd books to copy nature; we endeavour to fix certain qualities, by breeding with animals possessing those qualities to a marked degree for a great many generations. These fixed qualities will be transmitted to a greater or less extent with almost unerring certainty. Infirmities, such as bad conformations and predisposition to disease, "bred in the bone," will be transmitted as surely as good qualities, and intensified if you wish it.

Thus, by mating animals with weak pasterns the progeny is still more liable to disease of those parts.

"Sports" will occasionally turn up, but less so as the breed becomes perfectly pure. They may stay in a few generations, and if not encouraged will disappear.

The peculiar law of reversion or atavism will again and again crop up, accounting for the occurrence of disease otherwise unaccountable. In the human subject many nervous troubles are said to skip a generation and then crop up again, and so it is with specific ophthalmia, and possibly some other diseases of the eye. It is difficult to say whether the sire or the dam will have the more influence on the progeny. Provided they are equally well bred, the result is sometimes pretty well shared by both, though generally slightly in favour of the stallion. But so much seems to depend on the character, disposition, and so forth of the progenitors, that it is impossible to lay down a rule. It is a peculiar fact that often the mother marks herself more on the female progeny and the sire on the male. But in the case of common mixed-blooded mares put to a well-bred stallion the qualities of the sire will predominate in nine cases out of ten. Thus it is that some mares breed after the horse, as it is called. In regard to some diseases due to an actual poison, the fœtus is more likely to become affected through the mother, having such close connection with her through the placenta.

In thinking of hereditary diseases, it is well to remember these few laws, and I will proceed to classify them as best I can.

I. Diseases *directly transmitted* from the sire or dam.

(*a*) Those due to a specific germ, in which the disease exists prior to birth. In this case the disease has been transmitted to the fœtus either from the spermatic fluid, the ova of the female, or through the placenta. Among such diseases whose maternal heredity is well known, both in man and in the lower animals, are Small-pox, Measles, Scarlet Fever, Syphilis, Chicken Cholera, Symptomatic Anthrax, Pleuro-pneumonia, Small-pox in sheep, and Tuberculosis. The influence exerted by the male parent in the transmission of contagious diseases is, however, more limited than that of the mother, although Syphilis in man and Tuberculosis in animals are known to be inherited by the offspring of the male parent affected with these diseases. The extent to which Glanders and Anthrax Fever are contagious is a question of great interest, and there seems to be a difference of opinion regarding them.

(*b*) Where the inherited conformation constitutes a disease, such as Parrot-mouth, Undershot, congenital malformation of the pelvic bones, etc.

(*c*) Where the disease is directly inherited, as in animals born blind, deaf, etc.; but these instances are rare in the lower animals.

II. By far the most fruitful cause of disease is where a *predisposition is inherited*, and if exposed to unfavourable influences the disease is easily produced. This predisposition may be due to conformation, minute structure, temperament, colour, and so forth, and we will deal with it under these heads.

(*a*) Predisposition due to conformation. We have decided that certain conformations are required for certain work, and it has been found by experience that other conformations predispose to disease. Thus, short, upright pasterns and straight hind legs predispose to bony diseases, as concussion is thus increased. On the other hand, very oblique pasterns or crooked hind legs predispose to strains, breakdown, curbs, etc.

An animal which is "tied in" below the hock is subject to bony diseases of that part; for these bones are receivers of weight and distributors of concussion, and their capability of the performance of that function depends upon their size and development. All are aware of the value of good, large, well-formed joints.

It is sometimes found that the anterior articular surface of the distal end of the femur is unnaturally level, the external trochlea being but poorly developed. Such a conformation predisposes to luxation of the patella. This has been notably hereditary in some of the heavy sires used in this province.

Conformation is a very active factor in diseases of the feet; weak feet are predisposed to diseases of many kinds, and narrow, contracted feet in the same way.

These different types of faulty conformation are transmitted solely by heredity.

Often conformation betrays the constitution of the animal; thus a narrow chest or a weak "middle piece" speaks plainly of the development of the structures it contains, and there is no more important predisposing cause to disease than weak vital powers. If the lungs and heart are but poorly developed the whole of the tissues must suffer, as the one is to aërate the blood, and the other to distribute it throughout the body. If an animal cannot assimilate nourishment properly, every cell in the body must suffer.

(*b*) Predisposition from lack of constitutional vigour. It is a recognised fact among all breeders that close in-and-in breeding, especially in an established race, results in loss of vitality and constitutional vigour in resisting unfavourable influences. Thus, many of our pure-bred cattle are subject to Tuberculosis, and do not seem to have sufficient power to resist the various diseases which flesh is heir to. Nobody will deny the fact that disease is

far more prevalent in our fancy herds than in the common cattle of the country. But the mode of breeding, the management, and the feeding have much to account for this.

In the first place, long-continued in-and-in breeding has been resorted to, to a great extent, in the development of all the "made breeds," and doubtless this has been the necessary course in order to fix certain qualities. But the animals have been pampered and forced from their youth up, and the selection of sires with constitutional vigour has only been a secondary consideration. And so you see that this loss of hardiness, strength, and endurance is not necessarily an accompaniment of pure-breds, but depends largely on the above facts.

Many examples of the truth of this statement can be brought forth, and I have only to mention in its support the thorough-bred horse. Here is a breed that has been moulded by the hands of man probably longer than any other race of the domesticated animals. Yet there is not a breed in the equine race that can touch it for speed and endurance combined. The simple reason for this is that those sires have been chosen which were noted for their vitality; for on this depended their ability to stand in a long, closely contested race. None of the practices that have combined to impair the strength and vigour of our pure-bred cattle, sheep, and swine have been resorted to in the breeding of the thorough-bred. In-breeding and pampering have been frowned at, and the selection of the stoutest and best specimens of the breed has been the touchstone of their success.

In dogs the evil effects of long-continued in-and-in breeding are plainly seen, and give rise to much trouble. Rickets, Hydrocephalus, Epilepsy, and even Idiotcy are frequently seen in some strains that have been bred in that way.

There may be a lack of constitutional vigour produced in the offspring by the stallion being in a weakened state at the time of service, such as is produced by wasting diseases, by too frequent coition, by extreme old age, or from being too young. The same remarks apply to the dam during her pregnancy.

In the majority of cases the conformation of the animal betrays his constitution to the judge of live stock. The shallow and narrow chest or the weak crops show weakness of vital organs, and the slab-sided, herring-gutted, washy looking animal shows a tendency to abdominal troubles and a poor constitution generally.

(*c*) Predisposition from temperament. This is a difference of organisation, and there may be a want of development of certain parts, or the development may be carried to extremes. There certainly exists a remarkable difference among animals in the way

in which certain structures and qualities are developed, not only in different breeds, but in different animals of the same breed.

The three chief temperaments which we are interested in are the sanguineous, the nervous, and the lymphatic.

The sanguineous implies an activity of the circulatory and blood-producing organs. This is well illustrated by the fact that the most highly developed animals and the most highly developed parts are more subject to the inflammatory process than those lower in the scale of development.

The nervous temperament is closely allied to this; for where there is a large blood supply there is generally a large distribution of nerves, and therefore this is shown in the same way.

But *nervous temperament* also implies a want of proportion of some of the functions or properties of the nervous system. Animals with this temperament have not necessarily extra nervous power; indeed, the opposite is often the case. They fret easily, soon become exhausted, often scour on excitement, tremble with fear, and lose their appetite easily, thus predisposing to many diseases.

The lymphatic temperament. In this class of animal there is a want of the sanguineous and nervous temperaments, of arterial tonicity, of quality throughout the system. The circulation is sluggish and the blood-vessels are inactive; the capillaries and nerves, especially of the dependent parts of the body, are often congested and œdematous. This accompanies many of the coarser breeds, and is shown by the want of quality throughout the system.

These animals, owing to their low organisation, have great difficulty in throwing off disease; they do not seem to have that compensative power of the well-bred animal. In many cases they are tardy in getting disease, but the recovery is also slow. If effusion takes place it is difficult to cause its absorption, and in such an animal it is often difficult to establish the reparative process.

The whole body is spoken of by physiologists as being composed of a number of cells, certain properties, at the expense of others, being developed in the cells to constitute the different tissues. Compare the cells of a lymphatic animal with those of a well-bred one, and you will find them coarser, looser in texture, and they have not that nicety of finish on them that you find in the animal showing quality. It is the same with every cell in the body. Compare the bones. The specific gravity will be less, the shell of compact bone will be thinner, the little plates of the cancellated structure, under the microscope, will appear thicker but more spongy, and the whole structure of a looser texture. Such bone is obviously predisposed to disease.

Animals with the lymphatic temperament are predisposed to Lymphangitis, skin diseases, diseases of the feet, bony diseases, and many others too numerous to mention.

(*d*) Predisposition from colour. That this has some influence in predisposition to disease has been shown by numerous cases of Crusta Labialis recorded in the meetings during the winter. Possibly colour has some influence in other skin diseases and in diseases of the hoof. Melanotic tumours are associated almost entirely with certain colours in the equine race. It has been observed that where you have a white patch round the eye the organ on that side is more predisposed to irritation than its fellow.

(*e*) And now I wish to make a few remarks on the predisposition to disease which exists in some animals, which cannot be accounted for by any of the above causes; and I refer to where I think the minute structure of a local spat is changed, and the changed condition is transmitted, in a modified state, to the progeny. There are Splints, Spavins, and Ringbones that I do not see how to account for in any other way. A sire with a perfect limb, save a Ringbone, often transmits the disease to the progeny, in which it is developed with very little exciting cause. I do not refer to a case in which the Ringbone in the ancestor was produced purely by accident.

Is it not possible that the minute structure of the bone in that locality was altered and transmitted as such? There is no reason why it should not, the same as any other quality which has become fixed in the breed.

Take another example, in Sidebones. Many colts from certain sires have been known to develop Sidebones with little no exciting cause. There must have been some abnormal condition in the structure of the cartilage which rendered it particularly liable to take on the ossified state.

In some diseases one would be led to suppose that it was all in the natural course of development for the animal to assume these abnormal conditions; indeed, it is said that colts have been born with splints, but I could not vouch for the verity of that statement.

It has been stated by some writers that in the case of some bad roarers known to possess hereditary taint the recurrent laryngeal nerve supplying the muscles on the left side is wasted away, and in many cases is nothing more than a mere shred. Is it not possible that such a condition was inherited?

In navicular disease, besides the external conformation and action of the animal being predisposing causes, might not the minute structure of the navicular bone and of the bursa be abnormal, and particularly susceptible to any unfavourable influences? The same remarks might apply to Canker, to Laminitis, to diseases

of the eye, to some forms of Locomotor Ataxia, and a number of others which will readily suggest themselves.

On referring to a small work of Professor Law's, I find he lays down a rule that a disorder which is active and causes suffering at the time of reproduction is most likely to tell injuriously on the progeny, and in support of this he quotes the following interesting case: A mare not predisposed to recurring Ophthalmia had a burdock entangled in her forelock, so as to be directly upon the eye, which was thus kept inflamed and discharging during the course of pregnancy. The progeny, a filly, had the eye on the same side defective, and represented by a small *opaque* black mass. The dam recovered, and afterwards bore colts with sound eyes, as did also the one-eyed filly, in due course of time.

He thinks that colts born while the mother is suffering from the inflammatory action of periodic Ophthalmia are more subject to severe "moon-blindness" than those which are born after the mother has become totally blind and all irritation ceased. This is still more light on this important question, and should set us observing more closely, as there is probably more in this than is generally acknowledged, and it is quite possible that in breeding animals during the acute stages of disease, even if the disease itself is not produced, there is a tendency transmitted as a legacy to the progeny.

(*f*) In some cases it is thought that the factors of disease, be what they may—microbes and what is termed constitutional diathesis (for want of a more lucid explanation)—may exist in the system and operate at certain periods of life, during which time the system may be undergoing a change, or the necessary influences may be supplied for its development.

Sometimes tissues degenerate early, especially in the fatty or calcareous manner, thus explaining how many members of a family die at a certain age of fatty heart or apoplexy. But, as Green says, how diseases and tendencies to diseases which are not due to any specific poison are handed down we know no more than we do how it is children inherit the features of their parents.

And, before closing, I should like to direct attention to two or three of the more common hereditary diseases of the horse, which are of peculiar interest to us.

Roaring.—This has long been considered an hereditary disease, and is probably becoming more common on this continent every year. It is produced by exciting causes, such as hard work, especially during the growing period of life, and by tight reining; but in the majority of cases there exists a tendency to the disease.

That this must exist in some cases is plain, when we see a large

percentage of the progeny of some sire turn out roarers with but little exciting cause. Such of his colts as develop the disease often show a well-known conformation, by which we can to some extent foretell their after usefulness. Perhaps he is a large, overgrown gelding with a long, narrow neck, particularly clean cut about the region of the throat, narrow in the intermaxillary space, and often with a fine tapering muzzle. Such a conformation would lead you to suspect a roarer, but all these points are not always present, and are often not plainly marked.

The long, narrow neck and fine muzzle indicate a long, narrow trachea, which will be accompanied by a corresponding larynx. Of course, this conformation will be hereditary, and if it indicates anything more, that also will have been transmitted. It is thought by some that the recurrent laryngeal nerves from the pneumogastric, especially the left one, are deficient. They may exist, but are not properly developed, and therefore the supply of nervous power to the larynx is deficient. As soon as that part is called upon to exert itself equally with the rest of the organs of the body it will be incapable of doing so, and the result will be a roarer. Probably the anatomical structure of the larynx itself—the shape of the cartilages, the attachment, position, and development of the muscles and ligaments—is defective. All these changes may be the result of weakness, inherited from ancestors whose anatomical structure was gradually changing, the result of the peculiar kind of work they were endeavouring to perform.

Specific Ophthalmia.—I think there can be no question as to heredity being an important factor in this disease. Possibly, future investigations will show it to be due to a microbe, but that does not affect the division of the subject we have to deal with. It is true that years ago, when the science of ventilation was less put into practice, and stables often resembled hovels and pigsties, it was more common. Then the exciting cause was kept up, and any predisposition to the disease was soon tested; but now circumstances are not so favourable for its development, yet it is far too common at the present day, and it is still the general custom to breed affected mares, and in some cases stallions, suffering from the disease.

It is thought by most veterinary writers that this disease is primarily a constitutional one, the same as rheumatism or gout, but having a tendency to attack the organ of sight. Possibly this is the case, but I think the minute structure of the visual organ of the colt so predisposed is unnatural to some extent, rendering it liable to disease. In many cases the eye shows lack of development, and even where to all appearances it is full and healthy may not the minute structure be abnormal?

If constitutional, why not inflammation whenever there is a weakened state of the system, such as in the various fevers that horse flesh is heir to? But expose the animal to the fumes of ammonia, in a dark, ill-ventilated stable, expose him to agents which directly affect this organ, and he will soon show signs of recurrent Ophthalmia. If constitutional, why does not the fever recur when Cataract is established? A few exceptional cases are recorded in which the inflammation has been kept up for a number of years after this change has taken place, and then the disease might be affecting the substance of the optic apparatus, though it has lost its function. As I said before, Professor Law thinks that a colt would be more likely to suffer severely from this affection if he were developed in a mare while she was suffering from the acute inflammatory action of periodic Ophthalmia.

Diseases of the Feet.—Briefly, a perfect foot, in regard to size, should be in proportion to the animal's weight. It should neither be too flat nor mule-shaped, a happy medium between the two being desirable. The inferior part of the wall should describe a nice full circle in front, it being well carried back and not falling in at the sides. The sole should present a large degree of concavity, and the frog be free and healthy, the heels free and open and a moderate height from the ground. The texture of the horn should be fine, showing a hard, glistening appearance. Generally speaking, marked deviations from this formation predispose to disease.

Conformation is not only a cause of disease, from the feet working at a mechanical disadvantage, but may lead us to believe that certain structures are but poorly developed. Thus, in contracted heels the fatty frog is atrophied, and concussion will thus be encouraged.

In Navicular Disease, due to heredity, not only is the fatty frog small and wasted, but probably there exists a deviation in the minute structure of the parts of the navicular bone and bursa, most commonly affected by the disease. The progress of the disease may be hastened by the upright conformation of the pasterns and general action of the animal. If the texture of the horn should be coarse and open, it is obviously unfitted for certain kinds of work.

As to hereditary Canker, I think it is met with more in the heavy horse, and the lymphatic temperament has much to do with it, for the part would in such an animal be of a low organisation, and the phenomenon of a fungous growth in such a foot is not surprising.

I do not wish to convey the idea that all the diseases I have mentioned are hereditary in every case; in fact, hereditary ten-

dency of the sire and dam is sometimes unjustly blamed. Young animals are more prone to disease than those in the prime of life. Thus, the bones are far more vascular at this time, and the constitution not so strong, and if abused, disease is apt to be the result. And in many cases, even where a slight hereditary taint exists, if well taken care of at this critical period, the tissues may be so far developed, and strong enough to resist the exciting cause.

THE GENERAL SANITATION OF STABLE BUILDINGS.

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(*Continued from page* 249.)

It is obvious that if the water be allowed to evaporate below the "dip line" the principle of the trap is destroyed. Similarly, if the water becomes saturated with gaseous products it no longer intersepts them. The drain, therefore, requires to be continually flushed, and for this purpose a patent automatic flushing box to contain thirty gallons should be placed at the top end of the drain.

There is yet another necessity which is imperative, and that is the provision of a constant current of fresh air to traverse the drain. For this purpose the trap which we referred to above as placed at the sewer end of the drain is superseded by what is known as a proper *disconnection chamber.* This should be placed as near as possible to the stable wall, in which there is a *fresh air inlet,* leading, by way of the chamber, to the drain. From the distal end of the drain, a three-inch ventilating pipe is led to the outside wall, which it traverses until it ends at a point above all windows, and away from the down draughts of chimneys. The passage of air across this elevated pipe creates an *aspirating* force, and a constant current of air is maintained through the drain. It is important that this ventilating pipe be led up *outside* the wall, for fear of any subsequent leakage into the stable. A rain-water pipe, suitably placed, may occasionally be utilised for this purpose with advantage and economy.

Boiling water is sometimes injudiciously used for swilling stable drains; but when we consider that the temperature of the air in the drain is fully 30° F. higher than the atmosphere of the stable, and that heat only hastens decomposition, we shall realise that the practice is not to be tolerated.

Earth Drainage.—In the above paragraphs we have endeavoured to deal with the subject of drainage *by water,* as fully as is consistent with the scope of this paper. We have yet to allude to another method of treating stable refuse—the *dry* system, or removal and storage in *earth.* For this purpose it is important to

secure earth of rather a loamy nature, yet sufficiently porous. Sandy soil is of no use at all. The surface water is run off by channels into earth tanks placed outside the stable, where, with the solid material collected, it is mixed with the earth. The resulting manure is treated with some disinfectant which will not deteriorate its value—for this purpose common salt has proved very efficient—and is removed at appropriate intervals, to be used in some such way as *irrigation* is carried out for the improvement of the land. There is no legal restriction on this earth system, even in towns and in dealing with human excrement, and it is particularly well adapted for stables, cowsheds, and piggeries in the country.

Slaughter-houses.—It will not be inappropriate here to devote a few words to the question of slaughter-houses. The inhabitants of Great Britain are morally, if not politically, of a conservative turn of mind, and their tardy acceptance of some acknowledged improvements is a matter of history. For more than two centuries after the recognition of the Gregorian Calendar abroad, the independent Britisher was content to put up with the inconvenience of the "*old style.*" In our schools, even yet, the rising generation is taxed with the incongruities of an absurd system of weights and measures, notwithstanding the matured existence of the metric system. The Parisians, as far back as the beginning of this century, set us a salutary example by the erection—under an Imperial edict—of public *abattoirs*, as a substitute for private slaughter-houses. We quite realise the nuisance of these detached establishments, but we have not distressed ourselves about a remedy. In Paris there are at present at least five large abattoirs, together comprising 240 slaughter-houses, to each of which are attached the necessary offices and appliances, including stalls, pens, coppers, fat-melting pans, etc. These abattoirs are, in fact, individually a colony of slaughter-houses, adequately drained, properly ventilated, and provided with an abundant water supply. We have, however, begun a reformation in this respect, and we may hope that it will shortly become general. There is now an abattoir in the metropolis, in Copenhagen Fields, another in Edinburgh (as far back as 1851), and similar establishments have since been instituted in other large towns.

Water Supply.—The abundant supply of wholesome water for the use of animals is relatively of as much importance to their health and comfort as it is to our own, and it is our province not only to insist upon the purity of its supply, but also to look upon it with suspicion as an important and capable factor in the etiology of disease.

Water is derived from various sources, and in a natural state is always more or less impure. When *rain water* is collected before it reaches the earth it contains only such impurities as it derives

from the air, and in the country these substances are practically limited to oxygen, nitrogen, and carbonic dioxide. On the whole, however, owing to its relative purity and great aëration, rain water is palatable and wholesome.

The soluble constituents of *river water* at its source are chiefly derived from the rocks through which the feeding springs have percolated, but the dilution of the supply by the influx of tributary waters lessens the percentage of solid matter held in solution. The escape, moreover, of carbonic anhydride, from exposure at the surface of shallow streams, necessitates the precipitation of salts held in solution by its aid. The deliberate pollution of rivers by the drainage of towns and manufactories adds, of course, immensely to the amount of solids suspended and dissolved.

The purity of *spring water* is variable, notwithstanding its popular reputation. In some spring waters the quantity of dissolved solid matter is very trifling, whilst in others it may attain to 2,000 grains per gallon. No reliable estimate, however, of purity can be formed from the knowledge of the total solids, unaccompanied by further information.

The suitability of water for potable use depends upon (1) the source of supply, (2) the total solid matter held in solution, (3) the organic matter held in solution, and (4) the action likely to be exercised on the water by the means of supply. We have briefly referred to the sources from which water is obtained, and to the proportion of solid material held in solution in each.

The presence of chlorides is generally indicative of animal contamination, unless in the neighbourhood of salt districts and in sea-water. "Free ammonia" is obtained by distillation from almost all waters, but if a sample of water, after this process is complete, be treated with an alkaline solution of potassium permanganate, and further distilled, and if it is then found to contain ammonia, it may be safely inferred that the water is contaminated by organic impurities. If water contains more than ·08 parts per million of this "albuminoid ammonia" it is impure, according to the standard.

The different geological formations materially modify the character of water, besides determining its collection and the depth at which it can be procured. Percolating through the substance of rocks, it assumes to itself something of their nature. In the limestone regions springs are often fed from subterranean reservoirs, which have been formed by the gradual solution of the rock by water charged with carbonic dioxide. Again, for instance in the chalk districts, springs and streams are few, owing to the general porosity of the soil. The same is the case with the sandstones, old and new. But in all these formations deep wells yield largely.

The final point with regard to water supply is the consideration

of the means of artificial storage and transit. Large cisterns and tanks require to be both covered and ventilated, and all cisterns should be made preferably of slate or of galvanised iron. With leaden tanks the metal fortunately becomes coated with a comparatively insoluble salt, which prevents any further action, so that upon the whole they don't do much harm. The purest and most oxygenated waters affect lead the most, and next to these waters which contain much organic material; but it does not necessarily follow that the corrosion of the lead surface means a proportionate dissolution of the metal in the water. Water containing calcium carbonate, phosphate, or sulphate, and magnesium salts, has the least action on lead, because after the first reaction, resulting in the substitution of the metallic base, further action is prohibited.

When zinc pipes are alloyed with lead, as they frequently are, a galvanised current is induced which hastens the solution of the metal. For protection, a block tin pipe may be enclosed in the lead one, as in Haine's patent, or cast and wrought iron piping may be used for the conveyance of water, which should be treated internally with Dr. Angus Smith's solution.

In houses and stables the water service and drainage systems frequently enjoy an intimate acquaintance, which naturally results —nature is essentially consistent—in the corruption of the good by the evil. Nothing is more frequent than for a cistern to supply both a closet and a draw-off tap. This state of things is bad enough if the closet is of good pattern and the supply in the cistern frequently renewed. Imagine, however, a filthy privy in direct connection with a supply of water which remains for a lengthened period in the cistern! It would avail us little if we put a stable in full sanitary order, and left the atmosphere and water supply at the mercy of an ill-conditioned closet. For a stable closet any cheap pattern with a respectable trap will suffice. An automatic box, with a chain and ring, will hold sufficient water for a single flush, and will at the same time effectually disconnect the cistern from any danger of contamination.

The allowance of water per horse in the Army is, I believe, for cavalry, 8 gallons for all purposes; and for artillery, 10 gallons a day. The amount of water which animals require to drink depends largely upon the climate and season and the character of the food. Horses require about 6 gallons a day on dry food, cattle 6-8 gallons, and sheep and pigs ½-1 gallon. This becomes an important consideration in the question of transport.

Ventilation.—The genesis of the subject of ventilation may be said to be physiological, because the primary necessity for ventilation arises from the waste of oxygen in tissue combustion, and the production of material antagonistic to tissue vitality.

In the lungs, therefore, we find an immense capillary surface, only separated from the inspired air by the most delicate of pavement epithelium.

Much stress is laid, in various works on ventilation, upon the dangers of the accumulation of carbonic acid gas; but as a matter of fact, both men and animals can tolerate a much greater percentage than that which they are ordinarily called upon to breathe. It is not this gas itself which we have particularly to dread, but the substances which generally accompany it. With this idea, and because it can be more readily estimated than these organic materials, and also because it bears a constant *ratio* to them, it has been selected as an index of atmospheric purity.

The composition of the external air is liable to singularly little change, and this is accounted for by the diffusive power peculiar to gases themselves, the influence of air currents, and the reciprocal reactions on the atmosphere of animal and plant life. Animals, we know, inspire oxygen and nitrogen, and expire carbonic acid, aqueous vapour, and ammonia. Plants, on the other hand, absorb carbon dioxide, which, under the influences of sunlight and chlorophyll, gives up its oxygen, which by exhalation is restored to the air. This wonderful interchange of gases between flora and fauna goes a long way towards maintaining the constancy alluded to above.

The humidity of the external air varies with the climate and season, from 40 per cent. to saturation.

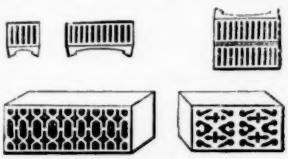
In an air space in which animals are confined the composition of the air is considerably altered, and the object of ventilation is to renew the supply. In respect of ventilation, then, the following points must be considered: (1) the provision of a sufficient and constant supply of fresh air, (2) proper means of exit for foul air, (3) the avoidance of perceptible draughts, and (4) the regulation of temperature. To effect these objects successfully it is necessary, in the first instance, to have an adequate cubic area per head. Every horse requires a floor space of 120 square feet (stall, including passage, $= 20 \times 6$ feet), which, with a height of 12 feet, ensures a space of 1,440 cubic feet. Cattle will manage well with 900 feet, and sufficient room to lie down upon, which, by the way, is not always conceded to them.

The limit of purity in an air space is that the CO_2 shall not exceed ·06 per cent. A horse adds 1·2 to 1·3 cubic feet per cent. of CO_2 per hour.

The following is a simple method of arriving at the approximate amount of CO_2 in a given atmosphere. Six clean, well-stoppered glass jars are procured, of the respective capacities of 450, 300, 250, 200, and 100 cubic centimetres, and are severally filled, by the aid

of a syringe, with the air to be examined, care being taken to avoid the collection of air direct from the lungs. The smallest jar is then made to receive 15 c.c. of lime-water, and if it becomes turbid it indicates that there are at least 16 parts per thousand of CO_2. If the air, on the contrary, remains clear, the "200" jar is similarly inoculated, turbidity indicating the pressure of CO_2 to the amount of 12 parts per thousand, and so on. I forget precisely the authority from which I gleaned this information, but I can answer for its simplicity and accuracy. The jars indicate in sequence the following figures per thousand: 16, 12, 10, 8, 7, and 6. For all practical purposes, however, the sense of smell affords a sufficient indication of the purity of the air in a building.

The means of ventilation in stables and kindred buildings is practically limited to the abstraction and supply of air by means of *air-bricks*, *valves*, *louvres*, *air-shafts*, and *cowls*, as the induction of aërial currents by heating and lighting media is seldom if ever practicable. No constant rule can be laid down for the ventilation of stables, because so many circumstances can interfere in different cases with the harmony of our intentions. Thus, a storey above may occlude the possibility of a louvre, or the presence of an attached building prevent ventilation on one side. Theoretically, *fresh-air inlets* should be located near the ground, and *foul-air exits* at the top of a building. It is important, however, whilst complying with these rules as far as possible, to avoid placing openings in positions where they may give rise to draught. It frequently happens that air-bricks are thus misplaced. If, for instance, they are inserted under the manger, and the current which they admit is not distinctly subordinate to more important currents of air above, the horses will be in a direct draught. When properly located, however, air-bricks are most important means of ventilation, and in every stable a row of them should perforate the wall, under the *eaves* on both sides. An iron air-brick (bar-pattern), a half-brick, and a double one are shown in the accompanying figures, as well as two ornamental patterns.



AIR BRICKS.

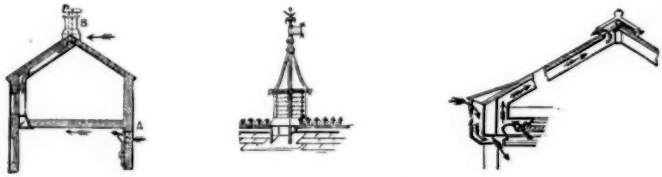
The valve-brick, represented under these, is well adapted for stables and cowsheds. The valve, shown in section, arrests any gust of air from without.

OUTLET BRICK VENTILATOR, WITH VALVE IN SECTION.

When the conformation of a stable building renders a *louvre* in the roof possible it is a means of ventilation which should certainly be employed, and glass plates may with

advantage be substituted for the inclined sideboards for purposes of light. Whether a louvre is present or not, small workable windows should, as suggested by Sir Frederick Fitzwygram in his book, be placed above each horse's head. This author's lucid descriptions leave little to be said upon the position of doors, the construction of louvres, and other points, which are copiously illustrated by intelligible diagrams. The object of this paper is, as was before hinted, as much to suggest remedies to existing defects as to detail what is sanitarily perfect. It is often in our power, by a little reflection, materially to improve, for the time being at any rate, even the worst surroundings; and such foresight will frequently be repaid by distinct improvement in clinical cases, which would otherwise perhaps succumb to adverse influences.

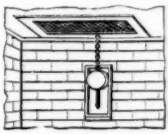
LOUVRE WITH VENETIAN-BLIND SIDE PLANKS.



AIR SHAFTS.

Some idea is given in the above figures of the manner in which *outlet* shafts are constructed. There is a fresh-air inlet at A (in the left-hand figure) by which a current is obtained which sweeps the foul air, collecting at the ceiling, up the shaft. For every horse a ventilating surface is allowed, similar to that which accompanies the type. An air-space running along between the floor of the loft and the ceiling of the stable connects these separate openings with the one shaft.

The central figure is a modified louvre receiving an air-shaft. It is essential that all shafts should be constructed, as far as possible, without bends and angles, and where any departure from the straight line is positively essential the corners should be made round and smooth.



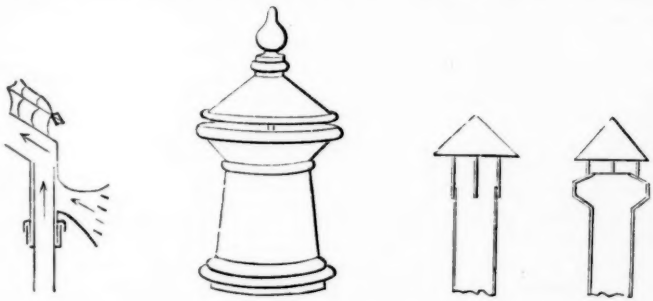
SURFACE OF OUTLET VENTILATOR, WITH COUNTERPOISE.

Cowls and turrets are fixed at the top of outlet shafts, and their function is to increase the *aspirating* force. The crude idea was simply a cylindrical pipe, covered with a hollow cowl.

The directions of the aspirating and induced air currents are in-

dicated by the arrow-heads in the first figure. These drawings are intended to represent only some of the simpler patterns, but the patented goods are both numerous and complex.

Good light and sufficient heat are both essentials in the stable, but fresh air should not be sacrificed for warmth. A temperature, however, of 60° F. should, as far as possible, be maintained. Double roofs, enclosing an air-space, are very effectual for maintaining a mean temperature in the extremes of climate. Hot air



and water pipes answer very well for heating stable buildings, but they are expensive, both to fit and to keep going. In a large stable in York these pipes are suspended just above the horses' heads, with the result that animals standing there in the winter appear to one to be sufferers from headache; but we are debarred, of course, from subjective inquiry.

Actual combustion of coal gas and oil is a drain upon the store of oxygen which cannot be entirely overlooked, when we consider that a litre of coal-gas will exhaust the oxygen from eight litres of normal air, or that an oil lamp burning 150 grains of oil per hour produces, upon an average, half a cubic foot of carbonic dioxide.

INDIGESTION CAUSING ANTE-MORTEM RUPTURE OF THE DIAPHRAGM AND DEATH.

BY J. A. MEREDITH, M.R.C.V.S., A.V.D., MHOW, CENTRAL INDIA.

Subject.—A grey Persian gelding, aged fourteen years, troop horse H 16, 5th Lancers. Admitted to hospital at 10 p.m., March 25th, after having been observed in the troop lines to be lying down and breathing heavily. He was placed in a loose-box.

Symptoms.—Profuse sweating about the abdomen, restless, and

inclined to lie down. Slight discolouration of the visible mucous membranes. Pulse, 42; temp., 101·1°. Gave anodyne draught, Tinct. Opii ʒj, Tr. Asafœtidæ ʒj, Aquæ suff., and ordered enemas.

11 p.m. Appears easier, not violent, and remains standing in one position. Urinated and passed a little fæces.

1 a.m. Suddenly became restless and appeared in great pain. Administered Tr. Opii as before, together with Spt. Aeth. Nit. ʒj, and repeated the enemas. After this he appeared dull, lay down, and remained perfectly quiet until 4 a.m., when he got up and walked round the box, hand-rubbing.

5 a.m. Abdomen distended, general appearance very dull, prevented the patient lying down. Rectal examination caused great straining and pain; no rectal space, and some difficulty in administering enemas. Gave aperient pill: Aloes Barb. ʒv; Gent. Rad. Pv. ʒij. Pulse, 45; temp., 101°. Refused all food and water.

12 noon. Pulse, 84; temp. 103·2°. Patient quiet and remaining in a standing position. Enemas continued. Abdomen not so distended.

5 p.m. Patient appears better, and may make a recovery. Temp., 101·2°; pulse, 62. Eating a little lucerne.

10.15 p.m. Up to this time the patient had promised a recovery, but suddenly a copious stream of clearish-coloured fluid flowed from both nostrils, amounting to about two gallons; he walked round the loose-box, fell down and died instantaneously. I have never in my experience met with so peculiar an ending to a case of this description. This extensive flow from both nostrils prior to death seems so rare, that I have been induced to record the case. *Post-mortem* appearances will, no doubt, account for the very sudden death.

Unfortunately I was not present just before death, so I could not discern any important symptom which may have presented itself.

Post-mortem.—Abdomen distended with gas, and contained a quantity of serous effusion which had escaped from the ruptured vessels. Upon removing the intestines, two extensive ruptures (ante-mortem) were observed in the diaphragm, one extending some eighteen inches in a circular direction through the muscular portion of the right side of the diaphragm about one and a half inches from the walls of the cavity; the other rupture arose from the ziphoid appendage on the left side, and extended in an upward direction into the phrenic portion of the diaphragm. The diaphragm possessed a torn appearance upon the borders of the ruptures, and had lost its firm touch. Deep discolouration of the serous covering of the whole intestinal tract, which seemed to arise from the exudation present in the abdominal cavity. Acute Mesenteritis.

Stomach contained a large quantity of undigested gram, but the mucous coat of the intestines exhibited a most normal appearance.

Liver small, friable, and easily broken down, and jaundiced in appearance. An interesting condition existed in the thoracic cavity; adhesions of about six inches by four were present on the left lung, which was firmly fixed to the costal pleura. No record existed in the history of this horse to show that he had at any time suffered from any chest disease. The lungs and heart were pigmented. This horse never during his illness appeared in great pain, and was not inclined to lie down.

PRECOCITY IN A CALF.

BY J. ADAMS, M.R.C.V.S., WARMINSTER.

About three years ago, a calf, about 3 months old, was sucking by its mother's side, when its owner, Mr. James Lowe, saw a young bull, owned by Mr. White, his neighbour, jump over a hedge and run towards the calf. Mr. Lowe hastened with all speed to stop his progress, but before he could arrive on the scene of action, the bull had jumped the calf, and *coitus* took place as usual. Fearing the consequence, Mr. Lowe took what care of the calf that he could, but at the end of the natural term of gestation it brought forth a good bull calf—healthy, sizable, and strong—and which at the end of a year was sold for £9. The mother and calf are now both living. I should like to know whether this is not an unprecedented occurrence, as I am now over 60 years of age, and never in my practice have I ever heard of such a thing before.

Editorial.

THE USE OF HORSE-FLESH AS HUMAN FOOD.

The sale of horse-flesh as food for mankind has long been recognised by the majority of European Governments as legitimate, and measures are in force for conducting such sale, so as to safeguard the interests and health of consumers. Attempts have been made on two or three occasions to introduce this flesh to the notice of the working classes in this country, but without effect; and the philanthropic individuals who made them, at some sacrifice of time and money, and perhaps also of feeling of sentiment, have generally received only the attention of the witlings who perpetrated jokes at their expense. One of these attempts took place a few years ago, its chief mover being M. Decroix, an ex-Principal Veterinary Surgeon of the French Army, who induced a Parisian horse-butcher to open a shop in London—in the neighbourhood of Leicester Square—where, for a short time, horse, mule, and ass flesh was exposed to the gaze of the curious and fastidious, but it found few customers. Decroix, in his cosmopolitan zeal for the good of his species, and in order to overcome our insular prejudice, even offered a prize in the shape of a gold medal, to any one who succeeded in establishing the sale of horse-flesh in England; but this reward was never applied for, for the simple reason that no one could claim it.

Prejudice and sentiment have been too powerful antagonists hitherto, in the way of popularising this article of food, and they have been so long in operation, that it will require much time to overcome them. Before the Christian era, the flesh of horses was more esteemed than that of oxen by the Northern peoples, who were only induced to give it up when they embraced Christianity, because its use was associated with paganism. Discountenanced from religious motives at first, these soon became merged in prejudice and sentimental antipathy, until now many people look upon such flesh with loathing, and would probably suffer the extremes of hunger and exhaustion before they could bring themselves to make a meal of it. And yet, as has been mentioned, it is a common article of food in many parts of the world, and there is no reason whatever why it should not be so in the United Kingdom. Darwin, in his "Voyage of the *Beagle*," shows us that in South America (Government of Buenos Ayres), the use of such meat by troops is most advantageous, mare's flesh being the only food which the soldiers have when on an expedition. He says this gives them a great facility of movement; "for the distance to which horses can be driven over these plains is quite surprising; I have been assured that an unloaded horse can travel a hundred miles a day for many days successively."

Our own troops should be accustomed to horse-flesh, for on active service it often happens that it is more plentiful than any other, and it

is always wasted because it is not usual to eat it. In the Crimea, where horses died in multitudes during the early part of the campaign, the soldiers perished of hunger and exposure; and yet it is doubtful if a pound of horse-flesh was eaten. The horse is among the cleanest feeding and daintiest of any of the consumable creatures, his flesh should be as nutritious if he is properly cared for, and he is as little liable to diseases which would render its consumption dangerous as most of them. If, therefore, this flesh can be sold at a comparatively low price, and proper precautions are adopted to ensure its being healthy, its introduction should prove a boon to those who cannot afford to purchase ox flesh, and who, stifling their sentimental objections to it, use it daily.

That there is now a desire to have it sold publicly as human food (it has doubtless been disposed of in large quantities surreptitiously for years), is evidenced by the petition recently presented to Parliament from Manchester and Salford, and which was signed by no fewer than 80,300 persons, in favour of a Bill for regulating its sale.

Such a Bill has been introduced by Mr. Knowles, the Member for West Salford, and there is every probability of its passing the Legislature. It is to be hoped that every requirement will be embodied in it, and with the experience of such countries as France to hand, there should be no difficulty in protecting the public against fraud and danger. Horses, including mules and asses, should be carefully examined by Veterinary Inspectors previous to slaughter, and even after the carcases are dressed, and if they are satisfactory, the hoofs should be officially branded, these remaining with the carcase until it is all disposed of, in order to establish and guarantee identity. In Paris, the additional precaution is observed of leaving the skin on the carcase, as is the case with calves' carcases in this country. But the examination of horses destined to furnish flesh to mankind must be carefully conducted on the score of public health, and this duty can only be safely entrusted to veterinary experts. Otherwise we shall have more risks attending the food supply—risks which should not exist, so far as flesh is concerned, if easily-enforced and reasonable measures were adopted.

OPERATION FOR ROARING.

THE following is an extract from the Annual Report of the Army Veterinary Department for 1888, and has special reference to operation for Roaring:—

"In my report for 1887, in alluding to the morbid condition which causes what is popularly known as 'Roaring' in horses, I mentioned that an attempt was then being made to abolish this serious cause of inefficiency by a surgical operation on the larynx, where the obstruction to the entrance of air to the lungs exists; and that I had reason to hope the effort would be successful. The urgent necessity for discovering some means of removing this obstruction effectively and safely has long been recognised, but hitherto endeavours to accomplish such an object have had such unfavourable results that they were discontinued. More than ten years ago I satisfied myself that there was no danger from operation in the larynx, and that the immediate cause of the Roaring might be successfully removed. Circumstances, however, prevented me from attempting this operation until the great increase in the prevalence of the affection, both in and out of the Army, compelled me to resort to it.

"In the five years from 1883 to 1887, there were 326 troop horses cast and sold because of this disability, being in the proportion of 5·6 per 1,000 of the average strength. In 1887, 61 were sold, or 5·27 per cent.; and in 1888, 73, or 7·56 per cent.; while the admissions were 187, or 1·40 per cent. of the average strength. These were horses which, owing to their distress in breathing, were unfit for further military service. Many more horses were retained, however, because, though their respiration was noisy, they could yet perform their duty. On May 1st, 1888, of 12,745 horses, 690 were so affected, or 54 per 1,000 of strength. It is probable that a larger proportion of horses belonging to civilians are suffering from Roaring, very likely 6 or 7 per cent. Medical treatment has afforded little benefit, and until operation was adopted, horses, however valuable they might otherwise be, were hopelessly depreciated, and very often quite useless because of this ailment.

"The operation resorted to has yielded very satisfactory and encouraging results. It was decided to operate only upon the most severe cases of Roaring—those which were so seriously affected as to be unfit for service, and they were selected by the veterinary surgeons of regiments and corps. As at first the operations might be considered as to some extent experiments (though they were not so in reality), they were commenced under my direction at the Army Veterinary School, Aldershot, which is licensed for experiments under the Vivisection Act, and performed by First Class Veterinary Surgeon F. Smith, who holds a licence to perform experiments. But as the Royal Horse Infirmary at Woolwich was more convenient for me than Aldershot, and as the arrangements were in every way preferable, the operations have been carried out there, and to my entire satisfaction, by First Class Veterinary Surgeon F. Raymond, F.R.C.V.S., who has shown remarkable zeal and skill in performing what undoubtedly is the most delicate operation in veterinary surgery.

"The earlier operations were, of course, not so successful in their results as those which were performed later, as everything pertaining to the procedure was novel, and knowledge had to be acquired step by step.

"Two horses operated upon early were apparently cured for about a month, but recovery was not permanent. From such failures most valuable experience was gained, and the operation and subsequent treatment have now been so perfected that the possibility of cure of Roaring has been placed beyond a doubt; while the operation itself is not only a very important addition to the resources of veterinary surgery, but has demonstrated for the first time that other diseased conditions of this part of the horse's throat, hitherto considered beyond the reach of surgical skill, can now be treated with every prospect of success. The institution of the operation has also added to our knowledge of the physiology of the larynx and adjacent parts; while it has been the means of introducing great improvement in the administration of chloroform to horses, by which rapidity in the production of, and recovery from, unconsciousness, safety to the animals, and great economy in the expenditure of the drug, have been obtained.

"Veterinary Surgeon Kay Lees, F.R.C.V.S., was temporarily transferred from Ireland to Woolwich to be instructed in the operation, in order that he might undertake it on his return to that country. Since his arrival at Newbridge, he has operated upon forty troop horses belonging to different corps; but the results cannot yet be definitely ascertained, as sufficient time has not elapsed. Of this number only one has died, death being due to Tetanus, a disease which often occurs from the most trifling injury; all the others have made excellent recoveries.

"Mr. Raymond, at Woolwich, has operated upon 103 troop horses, and, remarkable to say, has not lost one from the operation. The results are as yet only partially known, and there is every probability that they will be much

more satisfactory in 1889 than they have been in the year now under consideration, as the operation and subsequent treatment are so much improved.

"Of 7 horses belonging to the 5th Lancers (transferred to the Carabiniers), 6 have been reported as completely cured, and the 7th as having only a slight coarseness in respiration; all have been at duty for several months, and there are no signs of relapse. All were so badly affected as to be unfit for work.

"Of 9 horses belonging to the 14th Hussars, all are cured except two, which make a noise that may gradually subside. These were bad cases.

"Of 22 horses belonging to the Royal Dragoons, 15 are reported as practically cured, and 4 improved; while 3 are not improved. The 'practically cured' and improved are at their duty. These were all bad cases.

"Of 8 horses belonging to the 18th Hussars, 3 are practically cured, 4 are improved and daily improving, and 1 is not improved. The two first groups are at their duty. All were bad cases.

"Of 5 horses of the 20th Hussars, 2 are reported as greatly improved, the others as improving. All were bad cases.

"Of 4 horses belonging to the Royal Artillery, 2 were cured, and 2 were not improved.

"Of 2 horses belonging to the Army Service Corps, 1 was discharged fit for duty, the other was re-admitted for further treatment.

"A Riding Establishment horse was slightly improved, and a horse of the Remount Establishment was not improved.

"It will be seen by the above, that 35 horses operated upon were practically cured, 11 were so improved as to be rendered fit for duty, and some of them are still improving; while only 13 were not so much improved as to be fit for work.

"The result in some of the cases cured was very remarkable, the change from stridulous and distressed breathing, even at a slow trot, to easy and almost noiseless respiration after a two miles' fast gallop, being rather startling.

"Though it is somewhat premature to give a decided opinion as to the likelihood of the beneficial effects of the operation being of a permanent character, yet there is every reason to believe that they will be so. Should this prove to be the case, a great boon will have been conferred upon horse-owners, not only in this country, but throughout the world; as Roaring in horses has a wide geographical prevalence, and chiefly affects the most valuable breeds. Hitherto it has been considered incurable; now by a comparatively simple, almost painless, and certainly safe operation, the defect may be removed in at least the large majority of cases, and horses useless and suffering because of it, can be restored to efficiency and relieved from distress

"Everything relating to this condition, and the operation, I have dealt with in detail, in a work recently published, entitled 'Roaring in Horses *(Laryngismus Paralyticus)*.'"

SCARLATINA AND MILK.

At the last ordinary meeting of the Glasgow Philosophical Society, Dr. Neil Carmichael communicated the results of experiments carried on by him in connection with the outbreak of Scarlet Fever at Garnethill, Glasgow, last year. This epidemic was clearly traced by Dr. Russell to the milk of a certain farm, where were found two cows with ulcers and scabs upon their teats, similar to those described in connection with the Hendon out-

break. Both cows were desquamating freely. A calf fed on the milk of one was seized with a febrile disease, which nearly proved fatal, and which was followed by desquamation of the epidermis and of the hair. From a sample of the milk Dr. Carmichael obtained a creamy-looking mass, which consisted of micrococci, each the 40,000th of an inch in diameter, and similar organisms were found in the blood of the calf. With these organisms he made a slight, but as yet quite inefficient, attempt at inoculation. One calf inoculated had a slight febrile attack, and a little, mainly local, desquamation resulted. Dr. Carmichael succeeded in obtaining, by lime light, good photographs of the organisms.

Dr. J. B. RUSSELL remarked that, on the medical side, there had been no hesitation in accepting Klein's case as one of a high degree of probability; but the difficulty was to get the veterinary profession to look upon this as a matter worthy of consideration. It required some courage to speak in the presence of farmers and dairymaids of Scarlatina being propagated from the cow to human beings. If Scarlet Fever originated in the cow, it originated in one or other of the numerous lesions to which the teats of the cows were subject, and, until it was definitely ascertained which of them was the infectious one, the farming class should avoid using the milk of all cows suffering from such lesions.

In the annual report of the Local Government Board, recently issued, Dr. Klein continues his account of his researches into the alleged association between a certain form of cow-disease and Scarlatina. *The British Medical Journal* states that it will be generally admitted that by the evidence here brought forward he has powerfully supported the view which he enunciated in previous reports. He describes six experiments on cows which had calved three or four weeks previously. In four cases he used subcultures on solid media of streptococcus obtained from the blood or pericardial fluid of a calf experimentally infected with human "Streptococcus Scarlatinæ"; in two cases subcultures of the streptococcus derived directly from human Scarlet Fever. Each animal was inoculated by subcutaneous injection at the root of the ear. In all the six cases the animals developed ulcers on the teats; several of the animals had considerable fever and constitutional disturbance. Dr. Klein believes these ulcers to be among the very earliest evidences of disease in the animal. They occurred indifferently, whether the cow was being milked by hand or was suckling her calf. The teat-sores showed themselves after an incubation period of from four to nine days from the inoculation; and subsequently a more general affection of the skin was found, accompanied by more or less febrile disturbance, and sometimes by pulmonary symptoms. In the disease thus induced, a number of changes were found after death, distributed among various organs in the fashion of the changes of an acute specific disease, and exhibiting so much of constancy in their own manifestations as to make them, taken as a whole, characteristic of Cow-scarlatina. In two of the experiments the streptococcus was recovered from the milk; in one case the milk was drawn with antiseptic precautions during life, in the other it was obtained by incision after death from the deeper parts of the udder. Dr. Klein states positively that the streptococcus is not the S. pyogenes, and points out that the cows, having calved three or four weeks, were not in the parturient state. Dr. Buchanan, in his comments on the reports, lays stress on the fact that the sores on the teats appeared to be with difficulty, if at all, transmissible by direct inoculation from the infected animal to man. "This circumstance," he writes, "was hardly perhaps to be anticipated, seeing how readily other sore-teat diseases are so communicable, and how readily Cow-scarlatina at Hendon reproduced itself as human Scarlatina in the consumers of milk from infected cows."

Differentiation of Udder Diseases in Cows.—Dr. Klein has some observations upon the appearances by which the Hendon cow disease is to be recognised. He remarks that the term "spurious Cow-pox" had been used to include every form of udder disease in cows other than the so-called true or Jennerian Cow-pox; he claims to have now differentiated from this miscellaneous collection another disease—the Hendon cow-disease. This disease having been only lately identified, the opportunities for studying it differentially, even in its pathological aspects, have necessarily not been abundant; while still less frequent have been the opportunities for observing the clinical manifestations of the disease spontaneously occurring. Dr. Klein considers that it may be distinguished from the Wiltshire disease investigated by Professor Crookshank by the fact that in the case of the Wiltshire disease the visceral changes may be entirely absent, loss of hair is not a common symptom, the sores are flatter and more superficial and the scabs are longer adherent, and the disease is readily transmitted to the milkers. Another cow-disease from which he believes it may be differentiated is that observed in Edinburgh in 1887. The milk from the dairy where these cows were lodged had distributed a form of febrile sore throat among its customers. The sore throat could not be recognised as either scarlatinal or diphtheritic. A cow suffering from this disease was brought to London and placed at Dr. Klein's disposal; the disease was found to produce ulcers on the teats and visceral lesions, and to be capable of inoculating calves, so that it bore a greater resemblance to the Hendon disease than did the Wiltshire disease. The inoculation experiments, however, showed that the Edinburgh disease differed from the Hendon cow-disease as regards incubation period, the development and progress of the sores, and the aspect and character of the crusts. From the ulcers of the Edinburgh disease Dr. Klein isolated four micro-organisms, but to only one does he attach any pathogenic importance. This, the Streptococcus albus, he considers "stands in some necessary relation to the disease."

The *Weekly Scotsman* reports that a week ago an outbreak of Scarlatina occurred at Portobello, the cases numbering fifteen, with only one death. The fact of all the patients having been supplied with milk from the same dairy was regarded as likely to afford a reason for the outbreak, but an examination made of the animals and the milk failed to elicit any circumstances by which the outbreak could be attributed to that source. Mr. R. Rutherford, F.R.C.V.S., informs us that he was called in to examine the cows in question, thirty-two in number. They were a good lot of animals, distributed in five byres, and well cared for. Three-fourths of the number had the vesicular eruption on the teats, which is so common among newly-calved cows. This eruption was disappearing in most of the cases, only a few being recent. Mr. Rutherford had never known an instance of this disease being transmitted to the human subject, and he did not believe it was so in this case. Further, he gave it as his opinion that the same eruption would be found on cows elsewhere. Indeed, on the day when he made this statement he examined three large lots of cows in different places, and found several so affected; and he says the present is the first occasion on which the attempt has been made in Edinburgh to trace an outbreak of Scarlatina to diseased cows. There has been no increase in the cases of disease.

AN INTERESTING CASE AND HAPPY RECOVERY.

In a recent issue of the *British Medical Journal* the editor, Mr. Ernest Hart—who has been giving a series of articles on "Parisian Hospitals, Surgeons, and Physicians"—describes the Hôpital St. Louis and its staff, the chief of which is a most distinguished surgeon, M. Péan. In enumerating the

characteristics of that great operator he mentions several most interesting cases in which success has followed some remarkable feats of skill. One of these cases has a peculiar and engrossing interest for members of the veterinary profession, inasmuch as it refers to one of its most loyal and respected members, Professor McGill, late of the Glasgow Veterinary College, and now, we believe, one of the staff of an important tramway company in the French capital, and whose chivalrous conduct at the tumultuous annual meeting of the Royal College of Veterinary Surgeons two years ago will be remembered by those who were present on that occasion. We give the description of the case in Mr. Hart's own words, heartily congratulating our esteemed colleague on his recovery, due to his good fortune in falling into the hands of such a sage and accomplished surgeon.

After recording an operation on the brain of a patient in an almost hopeless condition, and the removal of a deep-seated tumour therefrom, followed by the disappearance of all the bad symptoms, Mr. Hart says—

"Another very interesting operation was one which M. Péan had just completed on the spinal cord. The patient had been in England buying horses. In the stable, whilst he was examining the foot of one of the animals, another horse seized him by the back. He was quickly released. He had felt a little pinch of the skin, but did not pay much attention to it. He remained for three days in England. On his return he found his strength diminished. His legs failing, he could scarcely walk, and the pain in his back became intolerable; the limbs became completely paralysed; he suffered from retention of urine. M. Péan was called, and examining the seat of the bite with care, he found the skin in good condition, but at about the level of the sixth dorsal vertebra there was one spinous process more projecting than normally. With the finger he detected that the projection of the two spinous processes of the subjacent vertebræ was absent. They had evidently been seized, and driven by the horse's teeth into the spinal cord. M. Péan made a long vertical incision in the median line, the centre of which corresponded to the vertebræ subjacent to that which projected. He found that the muscles were contused along the whole length of the vertebræ. Pushing aside these muscles, he reached the spinal dura mater, which was pierced by the spinous and transverse processes as far the costal articulations. There were about ten fragments which had entered the spinal cord. All these fragments were removed, and all the unequal portions of the transverse processes were resected. The operation was completed without complication, and the patient is now restored to almost his ordinary condition The operation was performed with a lever and small *pinces emporte-pièce*."

DOGS FOR MILITARY PURPOSES.

On 15th March, Mr. E. E. Bennett, A.V.D., delivered a lecture at the United Service Institution, Whitehall, on the above subject, General G. Erskine, C.B., Chairman of the Council, presiding. Having referred to the use made of dogs in war in ancient times, especially by the Greeks and Romans, the lecturer pointed out that the Spaniards in Peru and Mexico, the Dutch in their wars, the English under Essex in Ireland, the Piedmontese in the sixteenth century, the French and the Turks, both in the last and in the present century, supplied many examples of the utility of dogs to an army in the field. The Russians in their recent campaigns in Asia Minor, and the French in Algeria, reaped many advantages from the employment of these canine allies, and at the present time in many Continental armies, especially the German, dogs were a recognised institution.

They can be used in a variety of ways, but specially as *auxiliary sentinels*

to the outposts generally; as *scouts* on the march and on reconnoitring and patrol duties; as *despatch-carriers* on the march, in camp, and in action; as auxiliary *ammunition-carriers* on the march and in action; and as *searchers* for the wounded in an enclosed or wooded country, and at night or in stormy or foggy weather. The most important, however, of the foregoing is the *role* of sentinel; for it has been ascertained that well-trained dogs can detect with ease the approach of strangers, even in average weather, up to 150 to 200 yards. Sentries, therefore, supplied with dogs, would be very materially aided in their arduous duties, and the chances of successful night attacks and surprises would, by their employment, be very greatly lessened, if not altogether prevented; and, further, the tactics of such redoubtable foes as the Ghazis and Soudanese, who stealthily approach and stab sentries on their posts at night, would be entirely checked. As scouts, they would very greatly assist Infantry in an enclosed and mountainous country, and would be of service as despatch-carriers under similar conditions, and also where Cavalry could not be employed on this work, as during frosty weather, owing to the slippery state of the roads, and at night when, on account of the nature of the ground, it might be both difficult and dangerous for horses to travel. As ammunition-carriers, to supply the firing line, and also on the outward march, the dogs could carry in their saddle-bags 80 rounds of the old and 160 rounds of the new service pattern cartridges, weighing 8 lbs. As searchers for the wounded they would be specially valuable in a well-wooded district, and much suffering prevented—such as occurred in the vineyards round Metz, where the search parties failed to speedily find many that were severely wounded, and who died in consequence, either from exhaustion or long exposure.

The lecturer then went on to speak of the varieties best adapted for war purposes, selecting the farmer's sheep dog as the easiest to teach and the least prone to wander from the paths of duty, though many other breeds had much to recommend them; and, finally, in drawing attention to the methods of training, the care and treatment, and number of dogs to be employed per regiment, he concluded by referring to the *Naval* dog, which, besides being used on shore for all similar purposes to his military *confrere*, would be of immense value in detecting the approach of torpedo-boats, and also in the prevention of collisions, by giving timely notice of the whereabouts of other craft at night and during foggy weather.

ON THE LATELY DEMONSTRATED BLOOD-CONTAMINATION AND INFECTIVE DISEASE OF THE RAT AND OF EQUINES IN INDIA.

BY H. VANDYKE CARTER, M.D.LOND., BRIGADE SURGEON, BOMBAY.

(*Continued from page* 184.)

September.—Further trials made, and as a sample the following is quoted: After 22 hours the organisms in the centre of the preparation grouped in open spaces mostly quiescent; the thicker end is pointed, and the body shows a clear space between two bright spots; towards the margin they were more shrivelled, granular, and dotted in their whole length, excepting the flagellum itself. Red blood-discs somewhat misshapen, leucocytes quiescent and filled with granules; a few free cocci present, no bacilli. A moving monad in the centre being watched, it advanced like a worm, the attenuated end in front, and the hinder thicker end being drawn up towards the front end fixed as a kind of fulcrum: the first stage in this process is the projection of the flagellum, and the next the dragging forward of the thicker part by successive

wriggling movements not wholly sluggish; the body or thick part is distinctly granular, and contains bright particles of different dimensions and seemingly embedded in its substance. Occasionally a brief retrograde movement is noticed. Later (24 hours) the body sometimes is flattened, angular, dotted, and quiescent, the flagellum still being jerked at brief intervals; it seems as if the body becomes too heavy or is the first to fail; one or two of the bright granules are largest and connected with the angular projections. Micrococci free are present, and others apparently growing within the leucocytes. At 46 hours the monads not much altered in the centre of the preparation; the broader part is quiescent, expanded, angular, and of granular aspect; the narrow end is distinct and languidly moves at intervals. The blood-elements are hardly altered; active micrococci are seen in some places. At 76 hours all is faint, yet clear, the blood-cells not greatly changed; the monads are still visible, though shrunken, granular, and bent, with no signs of growth. At 117 hours the organisms visible, with granules in their thicker part, but no signs of spore-production; the attenuated end is clear and possibly a little swollen; red blood-discs faint, leucocytes distinct, with their granular contents. At 141 hours aspects the same, apparently some diminution of the granules in the body of the monads, with a clearness like those within the leucocytes present. Twenty-four hours later no change, except that the parts are fainter.

From my observations it might be inferred that at ordinary air-temperatures, in the absence of a continuous supply of oxygen and nutriment, these flagellated organisms do not grow in the blood; they do not, however, immediately dissolve and disappear, and the early drifting away from the centre, rigidity, and quiescence are phenomena which I know to occur with the febrile blood-spirillum of man prior to and consentaneous with a very decided growth in bulk. As to the significance of the shortening and dotting of the bodies of these monads, under the circumstances named, the alternative inferences of an incipient spore-production or of a mere plasmic degeneration would probably be decided in favour of the view of decay; yet this seems to be not absolutely certain.

Inoculation Experiments.—These were as follows: the subcutaneous injection of healthy animals with tainted blood of the rat, the animals so employed being the rat, dog, cat, horse, and monkey; also the intra-peritoneal injection of a healthy rabbit and a healthy monkey. The last-named attempt proved alone successful, but it may be useful to offer a brief record of the whole series of trials.

(*a*) Experiments on Rats.—1 and 2. A fragment $\frac{1}{10}$ square inch large of fresh blood-clot was introduced beneath the skin of the thigh of two animals with seemingly healthy blood. Second day, the blood of both preserves its normal aspect; so on the third, fourth, fifth, sixth, and seventh days. One rat now escaped; the other continued well, and was submitted to observation daily until the sixteenth day, when, the result being so far negative, it was killed and inspected without the detection of special morbid change. 3. A similar fragment of blood-clot from the heart of rat which had just died with flagellate organisms still persisting in the circulation was introduced beneath the skin of the thigh of an animal with healthy-looking blood. Evening temperature 101°; the animal looks well: second day, morning temperature 101·8°; the blood unchanged; e.t. 102·4°, no change and no evident constitutional irritation with this rise: third day m.t. 101·8°, *nil:* e.t. 102·4°, *nil:* fourth day m.t. 100·6°, *nil,* e.t. 101·6°, *nil:* fifth day m.t. 100·4°, *nil,* e.t. 101°, *nil:* sixth day m.t. 100·4°, *nil,* e.t. 101·4°, *nil:* seventh day m.t. 100°, *nil,* e.t. 101·6°, *nil:* eighth day m.t. 100°, *nil,* e.t. 101·6°, *nil:* ninth day m.t. 99·8°, e.t. 101·2°: tenth day m.t. 100° *nil,* e.t. 100°: eleventh day m.t. 100°, *nil,* e.t. 101·2°; and the animal continued well for five days longer.

(*b*) EXPERIMENTS ON THE DOG.—1. A healthy white puppy, a month old, had a few minims of fresh rats' blood containing several monads injected in the thigh: e.t. 100·6°; no irritation of wound: second day m.t. 100·6°; blood unchanged; e.t. 101°, *nil:* third day m.t. 100°, e.t. 101·2°, *nil:* fourth day m.t. 99°, *nil*, e.t. 100·6°: fifth day m.t. 100·4°, *nil*, e.t. 101°: sixth day m.t. 99·6° and e.t. 100°, *nil;* and so on for five days longer. 2. A healthy black male pup was injected with similar blood; e.t. 101·4°; nothing morbid visible in its blood: second day m.t. 101°, *nil*, e.t. 100°, *nil:* third day m.t 99°, e.t. 101·4°, *nil:* fourth day m.t. 100°, *nil*, e.t. 101°: fifth day m.t. 101·4°, *nil*, e.t. 100·4°: sixth day m.t. 100° and e.t. 100·4°, *nil;* and so on for six days longer.

(*c*) EXPERIMENTS ON THE CAT.—1. A large black healthy male; e.t. 101°; had inoculated at inner surface of thigh a minute clot of rat's blood filled with active organisms: second day m.t. 98°; was again inoculated with a small clot from another rat just killed, which contained many monads—this being done to ensure thorough trial; e.t. 100° *nil:* third day m.t. 98°, blood *nil*, the wounds scarred; e.t. 102°; animal feverish, but eats heartily and sites of inoculation not inflamed; a few large granule-cells observed in the blood: fourth day m.t., 98°; nothing abnormal seen in the blood except a few large granule-cells; e.t. 101·6°; nothing abnormal in the blood but some large plasm-particles and a few large granule-cells: fifth day m.t. 99°, *nil* e.t. 101°, *nil:* sixth day m t. 98°, *nil*, e.t. 101°, *nil:* seventh day m.t. 99°, *nil*, e.t. 99°: eighth day m.t. 100°, *nil*, e.t. 101·6°: ninth day m.t. 99° and e.t. 100·6°, *nil:* for five days longer the temperature remained normal. 2. A healthy fawn-coloured small cat; e.t. 101·4°; had inoculated in the thigh on point of scalpel a minute clot of blood from a rat which contained the monads: second day m.t. 99°; blood unchanged; e.t. 100·2°; white cells, many in the blood, which seemed poor in quality: third day m.t. 99°, *nil*, e.t. 100·6°, *nil.;* white cells many: fourth day m.t. 99°; only leucocytes and small plasm-particles unusual; e.t. 101·6°; leucocytes and large plasm-particles: fifth day m.t. *nil*, blood healthier-looking; e.t. 99°, *nil:* sixth day m.t. 99°, *nil*, e.t. 101·6°, *nil:* seventh day m.t. 98°, e.t. 103°; animal feverish, in its blood nothing unusual, but many white cells and no other apparent cause of the fever: eighth day m.t. 100·4° *nil*, e.t. 100·6°: ninth day m.t. 200·4° and e.t. 101·4°, *nil:* for five days longer the temperature normal.

(*d*) EXPERIMENTS ON MONKEYS.—1. A small fresh-brought healthy animal; had at 10 a.m. injected m. xx of infected blood of rat just before killed, on each side of thighs; temperature 102°; at 5 p.m. t. 103°; nothing abnormal seen in the blood; wounds unchanged; animal quiet: second day m.t. 100·4°; nothing abnormal in the blood; e.t. 101·6°, *nil:* third day m.t. 101° and e.t. 102°; no visible change in blood, but animal seems oppressed: fourth day m.t. 100°, *nil*, e.t. 101·4, *nil:* fifth day m.t. 100·6°; nothing unusual in the blood, but some granule-cells; e.t. 101·8°; nothing but some plasmic particles: sixth day m.t. 100·4°, *nil*, e.t. 100·4°, *nil:* seventh day m.t. 100°, *nil*, e.t. 101·8°, *nil:* eighth day m.t. 99° and e.t. 101°: ninth day m.t. 100°, *nil*, e.t. 101°: tenth day m.t. 100·4° and e.t. 101°, *nil;* and for five days more temperature remained normal.

2. A larger monkey, healthy as regards temperature and blood; had injected m. xx of fresh-drawn blood of rat containing many monads; e.t. 101.6°; its blood unchanged: second day m.t. 99°, *nil*, e.t. 101°, *nil:* third day m.t. 99°, *nil*, e.t. 101·6°, *nil:* fourth day m.t. 100°, e.t. 101°, *nil:* fifth day m.t. 100°, *nil*, e.t. 101·6°, *nil:* seventh day m.t. 100°, *nil*, e.t. 100·6°: eighth day m.t. 99·4° and e.t. 100°, *nil:* for five days longer a normal temperature.

These observations were made by myself in the month of February.

(*e*) EXPERIMENTS ON EQUINES.—These I was unable to carry out personally, but considering it particularly desirable to ascertain if the seemingly harmless rat-infection could be communicated to the horse, in which animal

an apparently similar parasitism of the blood is attended with the symptoms of serious illness, I forwarded on different occasions, towards the close of 1885, several Bombay rats, having the hæmatozoon in their blood, to my friend Mr. J. H. Steel, A.V.D., then at Poona, in the Deccan, with a request that he would be good enough to inoculate horses, as occasion offered, with the blood of these rats, in the same manner as had been successfully done in Burma with the blood of equines suffering from the "Surra" disease. And in January, 1886, I received an interesting record, from which the following extracts are made:—

(1) At mid-day infected rat's blood mixed with water was injected subcutaneously in the region of the neck and also into the peritoneal cavity of a horse, about 80 minims being injected at each site; at 2·20 p.m. temperature 101·9°, and no organism detectable in the horse's blood; next day there was observed a diffuse, painful, hard swelling at both sites of injection, and the patient seemed a little feverish and excitable; these symptoms subsided, and the animal was subsequently lost sight of.

(2) An aged horse had inoculated subcutaneously some infected rat's blood mixed with water; tumefaction occurred at the site of inoculation, and no other result is mentioned.

(3) The blood of a rat mingled with lukewarm water was injected subcutaneously in a mare and a pony. The mare received 80 minims in front of the right shoulder: on the following day marked swelling was perceptible at the spot, which, however, speedily declined until hardly perceptible on the ninth day; slight irregularities of the temperature were noted on two occasions, and up to the nineteenth morning, when observation ceased, no spirilloid could be found in the mare's blood, which had been daily inspected; some weeks later the animal continued in good health. The pony received at several punctures in the neck altogether about 90 minims of mixed rat-blood and water, and for the nineteen days ensuing there were noticed only some slight perturbations of temperature, slight swelling at the sites of inoculation, subsiding on the fourth day, and an absence on each day of any visible contamination of the blood of the pony, which some weeks later continued in good health.

(4) A chestnut pony mare in good condition received in each jugular vein about 65 minims of blood from a rat, mixed with tepid water, this blood teeming with very active organisms: a smart rise of temperature occurred seven hours afterwards; there was no local swelling, and no parasite could be detected in the blood of the pony on the first, second, third, fourth, and sixth day of experiment, nor at a later date was any positive result communicated.

Regarding these trials ending thus negatively, Mr. Steel remarks that "although the amount of rat's blood used in each case has been very small, it is to be remembered that an equal amount of blood from an infected mule would convey the 'Surra' disease to a healthy mule by either of the methods of administration adopted."

(f) In September, 1885, I made the following essays of intra-peritoneal inoculation, the subcutaneous method having hitherto failed. Rat's blood containing numerous monads promptly taken from the heart and diluted with an equal part of warmed salt-solution was introduced by syringe to the amount of 5 minims into the peritoneal cavity of a rabbit and a monkey whose blood was previously ascertained to present normal aspects.

(1) Rabbit, young; e.t. 101·6°: second day, m.t. 100·4°; no change in the blood twice examined; e.t. 102·2°; animal seems irritated, its blood unchanged: third day, m.t. 100·4°, *nil*, e.t. 102·6°, *nil:* fourth day, m.t. 101·4°, *nil*, e.t. 101°, *nil;* fibrine and white cells scanty: fifth day, m.t. 100°, *nil*, e.t. 101·4°, *nil:* sixth day, m.t. 100°, *nil*, e.t. 10°, *nil:* animal lively: seventh day, m.t. 101°, *nil*,

e.t. 102°: eighth day, 100·6° *nil*, e.t. 101·8°: ninth day, m.t. 100·4° *nil*, e.t. 101·6°: tenth day, m.t. 100·4°, *nil*, e.t. 100·4°: eleventh day, m.t. 100·4°, *nil*, e.t. 101·4°: twelfth day, m.t. 100·2°, *nil*, e.t. 101°: thirteenth day, m.t. 100·4°, *nil*, e.t. 101·6°: fourteenth day, m.t. 100°, *nil*, e.t. 101°; fifteenth day, m.t. 99·8, *nil*, e.t. 100°: sixteenth day, m.t. 99·6°, *nil;* and for a few days longer similar negative results.

(2) A small monkey (*Macacus radiatus*), with healthy aspect and blood; m.t. 101°; possibly not all the injected material reached the peritoneal cavity, as the blood had coagulated, and it may have been blood-serum chiefly which penetrated deeply. Second day, m.t. 100°; eighteen hours after experiment the animal seems well, no local swelling, but abdomen slightly tender at site of puncture to the right of the navel; in the first sample of blood taken from a digit two monads were detected very actively moving, and otherwise presenting all the aspects of the hæmatozoon seen the day previously in the rat; they kept near to each other, and were long watched; temperature at 1 p.m. was 100·6°; at 5 p.m. t. 102°; another active organism was seen in a fresh specimen of the blood from another digit; t. at 9 p.m. 100°: third day, m.t. 101°; a specimen of the blood now taken showed a single active monad; at 1° p.m. t. 100·6°; at 5 p.m. t. 102°; a flagellate organism like that of the rat was again found in the blood, as before; at 9 p.m. t. 100·2°: fourth day, m.t. 101·4°; I failed to detect any parasite; e.t. 101·6°; no parasite seen, but much plasmic matter (?) and many white cells; at 9 p.m. t. 99·6°: fifth day, m.t. 100·4°, *nil*, e.t. 102°; plasmic particles small, many; at 9 p.m. t. 100°: sixth day, m.t. 100·6°, *nil*, at 1 p.m. 100·4°, at 5 p.m. t. 101°, *nil*, at 9 p.m. t. 100°: seventh day, m.t. 100·4°, *nil*, e.t. 101·6°, and later 99·6°: eighth day, m.t. 100·2°, *nil*, but many plasmic particles, e.t. 101·4° and 99°: ninth day, m.t. 100·4°, *nil*, e.t. 101·4° and 99·6°: tenth day, m.t. 100·2°, *nil*, e.t. 102°, *nil*, at 9 p.m. t. 100°: eleventh day, m.t. 100·8°, e.t.s. 101·6° and 99·6°: twelfth day, m.t. 100·4°, *nil*, e.t.s. 101·6° and 99·4°: thirteenth day, m.t. 100·4°, *nil*, e.t. 102°, *nil;* at 9 p.m. t. 100°: fourteenth day, m.t. 101°, *nil*, e.t.s. 102° and 99·6°: fifteenth day, m.t. 100·4°, *nil*, e.t.s. 101·6° and 99·8°: sixteenth day, m.t. 100·4°, *nil*, e.t.s. 101·6° and 100°: seventeenth day, m.t. 100·4°, *nil;* and subsequently this animal long remained well.

Summary of Experimental Results.—Of fifteen varied trials, one furnished decided positive results, and the chief object I had in view was thus attained. Records are detailed here for the guidance of future investigators; and the conditions of effective inoculation being probably complex, some amendments in the methods above used will doubtless suggest themselves. Culture of the inoculated blood seems a promising means, varied at discretion. Respecting the successful result in the monkey, to all appearance the organism newly visible in the blood was identical with those before found in the rat; and I calculated that if there were no more than 3 ounces of blood in the monkey and only two monads in a drop, there might have been about 3,000 of these organisms circulating on the second day after inoculation, with a probability of the total being really larger. It did not seem quite certain that a reproduction of the rat's organism had taken place in the circulation of the monkey; but possibly this was so to a very limited extent. By experiment it is known that on mixing tainted blood with healthy mule's blood, or that of healthy bullock or goat, the organisms are not at once rendered quiescent or killed. (Steel.)

Having now given the data acquired in Bombay, I proceed to compare them briefly with other information, including the material sent to me by Mr. Steel from British Burma.

For valid inference it was obviously needful to ascertain the sameness of the things under comparison. This might be done either morphologically or biologically; and one striking feature of the present instance consists in its

offering an apparent discrepancy in these two respects, which, so far as I know, is unique in the annals of experimental pathology.

First, as to the morphology of the hæmatozoon. Judging from description, there can be no doubt that the organism found in Bombay is identical with that detected by Lewis in Bengal, such inference being confirmed by the micro-photographs appended to the Calcutta Memoir of 1879 and the remarks and drawings in Dr. Lewis's "Further Observations," London, 1884. Here I may note also the very close similarity (at least) of the Indian hæmatozoon with that of the German "hamster" described by Wittick and illustrated by excellent photographs, with a comment in Koch's well-known article, *Mittheill, a. d. Konigl. Gesund. amt., Band.* I (Berlin, 1881.) And not less evident is the identity therewith of the London flagellate protozoa more recently described and illustrated by Dr. E. M. Crookshank, l. c. 1886. I am not acquainted with other details (if any), published in India or elsewhere, respecting the seemingly non-pathogenic hæmatozoon of rodents; but the above concurrent testimony is sufficient to establish the wide prevalence, as well as identity, of this species of blood-parasitism.

Adverting, next, to the pathogenous equine-form, my observations date from the beginning of 1885, on the receipt from Rangoon of Mr. Steel's dried specimens of blood of the naturally diseased mule, and the artificially infected mule, dog, and monkey, taken at different periods of illness. The preparations arrived at Bombay in fair condition, and were successfully stained with methylene blue, methyl-violet, and fuchsine. After careful and repeated scrutinies, I arrived at the conviction that no essential difference in aspect existed between the organisms present in the natural and the acquired disease, nor between either of these sets and the common rat-infection. Learning subsequently that Dr. Lewis had arrived at a similar conclusion, as regards the hæmatozoon of Calcutta rats and of the Punjab "Surra" mule disease, as well as of a dog infected therefrom, my notes were allowed to stand over. Dr. Crookshank has since demonstrated that the organism from the Punjab entirely corresponds in aspect to that found in London rats. Lastly, Mr. Steel having become well acquainted with the Bombay organisms in the fresh state, is also of opinion that their aspect is identical with that of the parasites in fresh "Surra" blood as seen in Burma. More recently still the equine malady and its hæmatozoon have been detected by the same observer at Poona, in the Deccan; so that India is the seat of a widespread and very serious equine disease, having for one of its characteristics a blood-contamination seemingly identical with one largely prevalent amongst common rodents of the country. Other countries may be in the same predicament.

The several links in the above chain of identifications seem nearly equally strong and connected; for observers have been competent, and in itself the hæmatozoon is peculiar enough to be readily recognised, having in each of the instances quoted preserved a similarity of form, dimensions, structure, and movements which seems never to have surpassed the limits of a possible normal or incidental variation. In both rodent and equines the numbers visible at a time, their relation to the ordinary blood elements, changes on keeping and behaviour with reagents, have been also practically identical, the entire evidence being as valid as that commonly accepted when widely separated observations are inter-compared. I doubt, indeed, if by simple inspection the infected rat's blood could be distinguished certainly from that of the "Surra" mule, dog, or monkey. This is not to affirm that no visible differences actually exist, but that in each instance characteristics have been maintained amidst differences not more frequent or considerable than might be anticipated from the varying conditions of observation.

Secondly, as to biological aspects. The vital properties of the blood-parasite as concerns the organism itself will be alluded to under the next

heading; and respecting its influence upon the state of the infected hosts, both rodent and equine, the following remarks are offered. As regards rats, the testimony of Lewis and Crookshank has been concurrent with my own experience narrated above, being to the effect that the health of the infected rodent does not seem impaired either generally or specially, as contrasted with that of other captured rats whose blood was free from visible contamination. I further ascertained that no alterations of temperature occurred with the presence, sudden disappearance, and absence of the hæmatozoon. Apart from the general nutrition, no special function seemed disturbed; and at autopsies no particular organic lesion was noted. When infected rats died spontaneously it was not differently or more obscurely than happened in the case of the non-infected similarly deceasing. On the other hand, the entire history of any individual not being known, it was not certain that a true normal standard of comparison had been available; moreover, the first entry of the parasites into the blood was never witnessed, and the influence of repeated infection was not learnt; in such small animals blood-observations were necessarily limited in number and volume, and much may have been overlooked; moreover, as to sickness and disease, the inevitable daily manipulations and punctures, added to injuries inflicted during capture, constraint, and change of diet, wou'd of themselves cause a disturbance of the system possibly interfering with a correct diagnosis; and, in sum, I was not disposed to regard my own results as final.

In his comment on the infected hamster, Dr. Koch, noting the occurrence of spontaneous sickness and death, with on autopsy no lesion in explanation, insists rather upon the contaminated state of the blood; nothing, however, is said of comparison with non-infected animals dying in confinement, or of experimental inoculations. Results being so far negative, there is next to state that mere obscurity of symptoms and lesion does not preclude the possible existence of a veritable blood-poisoning, the biological proof of which would be the artificial infection of a healthy animal of the same or near species. As regards healthy rats, according to my experiments these did not suffer by inoculation with the tainted rat-blood hypodermically made; nor did cats, dogs, or monkeys; nor did the rabbit inoculated through the peritoneal sac, nor the horse as tested by Mr. Steel in both these methods and also by intra-venous injections. In not one of these instances was there any communication to the healthy animal of either visible or occult blood-contamination, as proved by the unaffected general state of the recipient and by the absence in its blood of an organism like the rat's hæmatozoon. Here the last of my experiments on the monkey by intra-peritoneal injection possesses a special significance, since it demonstrated that the hæmatozoon which seems innocuous to the rat is also harmless to the monkey, so far as may be judged from a single datum carefully acquired.

Adverting now to the biological properties of the same blood-parasite as manifested amongst equine animals (also the camel), and in the dog and monkey when inoculated from equines, a notable difference becomes apparent. Thus it has been found by Dr. Evans and Mr. Steel (and since by Mr. Gunn, A.V.D.) that in the horse and mule the presence of this hæmatozoon is constantly and exclusively accompanied by a serious general disorder, which in its symptoms is more or less protracted and emaciating, at intervals febrile, icteric, and hæmorrhagic, intractable by remedies, and in its termination fatal, without the production of any strictly pathognomonic lesion excepting that of the blood. Observers agree that this malady is not contagious or infectious in the ordinary sense: naturally occurring it is endemic, seasonal and limited, so far as appears, to the horse, mule, and camel; it may prevail extensively, and has been popularly recognised by various names, of which "Surra" is one, that of "Equine Relapsing Fever" being a designation proposed by my friend Mr. Steel

(see below). From the statements made it follows that the disease is a general one, not less characteristic in its symptoms than in its visible blood-contamination; and though not naturally communicated by contact or proximity, both these features may, I next note, be artificially reproduced by inoculation of the infected blood hypodermically and otherwise in other healthy animals. On this point the data are concisely as follows: Dr. Evans's transmission of the disease to the horse by subcutaneous injection (2) and through the stomach (2), to the dog by subcutaneous injection (1) and through either mother's milk or stomach (1 experiment); Mr. Steel's transmission to the mule (several times) and pony (1) subcutaneously and by stomach, to the dog subcutaneously (1), and to the monkey also (1). To this list may be added inoculation of the dog (1), with reproduction of the hæmatozoon, by Mr. Gunn, A.V.D. (*Quar. Jour. of Veter. Science in India*, No. 19, page 240, April, 1887). *(To be continued.)*

Proceedings of Veterinary Medical Societies, &c.

ROYAL COLLEGE OF VETERINARY SURGEONS.

QUARTERLY MEETING OF COUNCIL, HELD APRIL 3RD, 1889.

Professor PRITCHARD, President, in the chair.

PRESENT.—Professors J. Wortley Axe, Brown; Dr. George Fleming; General Sir Frederick Fitzwygram, Sir Henry Simpson; Messrs. Thos. Briggs, J. S. Carter, B. Cartledge, J. Roalfe Cox, E. C. Dray, Thos. Greaves, W. F. Mulvey, Jas. F. Simpson, Peter Taylor, Wm. Wilson, Wm. Woods, F. W. Wragg; Mr. Geo. Thatcher, solicitor; and the Secretary.

The SECRETARY read the notice convening the meeting.

Mr. DRAY moved, "That the minutes of the previous meeting be taken as read."

Mr. PETER TAYLOR seconded the motion.

The minutes were then confirmed.

Absentees.

The SECRETARY stated that he had received letters from the following gentlemen, regretting their inability to attend the meeting:—Messrs. Barford, Simcox, Perrins, McCall, Walley, Campbell, and Whittle.

Portrait of Mr. Carlisle.

The SECRETARY stated that letters had been received from Mr. Donald, the President of the Border Counties Veterinary Medical Society, and from Mr. Campbell, asking the Council to accept an oil painting of Mr. Joseph Carlisle, M.R.C.V.S., executed with a view of presenting it to the Council to be suspended in its chamber.

On the motion of Mr. CARTLEDGE, seconded by Mr. J. F. SIMPSON, the matter was referred to the General Purposes Committee.

Presentations.

The SECRETARY said that two publications had been received from Dr. Fleming; one was a report on "African Horse Sickness," and the other was a work upon "Roaring."

On the motion of Mr. DRAY, seconded by Mr. PETER TAYLOR, a vote of thanks was unanimously accorded to Dr. Fleming for his presentations.

Right-of-way.

Mr. PETER TAYLOR asked the President whether he had passed through

the back door within the last month with a view of maintaining their right-of-way.

The PRESIDENT said that he had done so.

Report from the Committee appointed to arrange the Annual Report.

The SECRETARY read the report.

On the motion of Mr. DRAY, seconded by Mr. PETER TAYLOR, the report as amended was agreed to.

Mr. J. F. SIMPSON said he presumed that any matter of importance that occurred that day would be included in the report.

The PRESIDENT assured Mr. Simpson that it would.

Report from the Finance Committee.

The SECRETARY read the report.

Mr. DRAY moved, "That the report of the Finance Committee be received and approved of by the Council, and that cheques be drawn to meet the liabilities."

Mr. WRAGG seconded the motion, which was agreed to.

On the motion of Mr. WILSON, seconded by Mr. DRAY, the report was adopted.

Report from the Registration Committee.

The SECRETARY read the report.

Mr. PETER TAYLOR moved, "That the recommendation of the Committee be accepted, and that the person mentioned in the report be suspended for a time."

Mr. THATCHER (solicitor) said that unfortunately the matter could not be dealt with. There must be twenty members of Council present, whereas there were only eighteen. The matter will have to be postponed until the next meeting.

On the motion of Mr. WILSON, seconded by Mr. PETER TAYLOR, the report, with this exception, was adopted.

Report from the Bye-laws Committee.

The SECRETARY read the report.

On the motion of Mr. CARTER, seconded by Mr. GREAVES, the report was received.

Mr. J. F. SIMPSON said it would probably be within the recollection of the President that after the close of the Bye-laws Committee meeting he applied for permission to see the minutes. That permission was granted. He looked at the Committee book, but failed to discover any minutes. He, however, had his own recollection of what took place. He had happened recently to be at the College, and the Secretary reminded him of his permission to look at the minutes. On doing so he found the report presented to the Council that day. As a member of the Bye-laws Committee, to put it mildly, he could only say that what was reported there was not what he recollected. He distinctly remembered General Sir Frederick Fitzwygram writing a proposal on a slip of paper. Sir Frederick Fitzwygram had to leave the Committee meeting, and on doing so said, "I am opposed to alterations of the Bye-laws unless they are absolutely necessary." His (Mr. Simpson's) recollection of what took place was that that was put to the meeting, but not carried. Again, in the report it was stated that Sir Frederick Fitzwygram proposed that the names of the Vice-Presidents should appear in italics. It so happened that Sir Frederick was not in the room when that proposal was made. Further, there was a proposition of Mr. Wragg's that the Vice-Presidents should be left out altogether. He (Mr. Simpson) so disapproved of that, that he spoke rather warmly on the matter, because he thought that

the Vice-Presidents were in every respect members of Council; and after a consultation with Mr. Barford he proposed that the names of the Vice-Presidents should appear in italics on the notice convening the annual meeting. The sum and substance of his remarks was that those proposed alterations were put before the Committee, but that not one of them was accepted by it. When the Secretary showed him the minutes he at once took exception to them, and said, "They are utterly wrong from beginning to end." There were other members of the Committee present at that Council meeting, and perhaps they would give their views upon the subject.

Mr. PETER TAYLOR thought that if the report was inaccurate it ought to be sent back to the Committee.

Mr. GREAVES said his recollection of the matter was that as the bye-laws had been so recently gone through it was altogether undesirable to alter them.

General Sir FREDERICK FITZWYGRAM, in reply to Mr. Simpson, said that his recollection was that the alteration with regard to the nominations was carried. He was opposed to it, and he tried somewhat to emasculate the proposal by suggesting that where there was more than one nominator the person nominated should select his own nominee. On leaving the meeting he had said that in his view alterations unless absolutely required were undesirable.

The PRESIDENT said that his memory fully bore out what had just fallen from Sir Frederick Fitzwygram.

Mr. WRAGG observed that it was his recollection that the alteration in the bye-law was agreed to.

Mr. MULVEY remarked that he had gone away with the impression that the Committee was of opinion that no alteration was desirable.

Sir HENRY SIMPSON said that as he was not on the Bye-laws Committee he had no opportunity of knowing what took place. The tendency of the present day was to allow everybody to do much as they pleased in the matter of elections, and he did not see what there was to prevent a man being nominated by half-a-dozen people. It was not, he thought, a matter which was worth fighting about. He maintained that any member had a right to send in a nomination, and that the nomination should appear on the voting-paper. The best plan would be to meet the proposal with a negative, and to move that the report of the Bye-Laws Committee be not adopted; it need not be referred back to the Committee.

The PRESIDENT said that was the only way of dealing with the matter.

Sir HENRY SIMPSON said that in that case he would move as an amendment that the report be referred back to the Bye-laws Committee.

Mr. PETER TAYLOR seconded the amendment.

Mr. J. F. SIMPSON moved as another amendment that the portion of the report of the Bye-laws Committee referring to the arrangement of the Vice-Presidents' names be the only portion adopted by the Council.

Dr. FLEMING said the Council could not adopt a fragment of a report. It must be either wholly adopted or referred back to the Committee.

Sir HENRY SIMPSON'S amendment that the report be referred back to the Committee was then put and carried.

Mr. MULVEY moved that Sir Henry Simpson's name be added to the Bye-laws Committee.

The PRESIDENT ruled the motion out of order, the Committee having already dealt with the report.

Dr. FLEMING thought it unadvisable at present to alter the composition of the Committee.

The PRESIDENT said that when the resolution came forward at the proper time he would deal with it as it deserved.

Recommendations to the Council.

Mr. J. F. SIMPSON moved, "That the Secretary be instructed to place the names of candidates for election to the Council of the Royal College of Veterinary Surgeons in alphabetical order upon the voting-papers. This instruction shall apply to the forthcoming and all succeeding eections." For many years, he said, the arrangement of the names upon the voting-papers had been a matter of chance, a sort of "run as you please." Last year some attempt had been made at adopting some system, which was that the names of the candidates should appear on the voting-paper in the order in which they were elected. It was not necessary to frame any bye-law for the purpose. All that was necessary was to give the Secretary some instruction, and in his opinion the Council could not adopt a better system than that of putting the names in alphabetical order.

Professor J. WORTLEY AXE asked what was the object of such an instruction.

Mr. J. F. SIMPSON said it was for the guidance of the present and future Presidents, and to avoid the possibility of any President being blamed unnecessarily for arranging the names in the order in which he, in his discretion, might place them.

Dr. FLEMING said he did not see what difference it made whether a man was at the top or the bottom of the list. It was a very poor compliment to the intelligence of the profession to think that they would vote for the first name on the paper. Whether a man stood at the top or the bottom of the list, if he were a proper man he stood an equal chance of election, and he thought it was scarcely worth while to alter the present arrangement.

Sir HENRY SIMPSON seconded the motion. He thought there were very good reasons why some decision should be come to by the Council. Up to last year there was a bye-law which said that the names of the candidates must be proposed in the Council. Sometimes they were put down in that particular order, and sometimes they were not. That bye-law had been swept away, and the profession had a perfect right to send in names whenever they chose up to a certain day. The question was when the Secretary received those names what was he to do with them. Last year he had directed that the names should appear *seniores priores*, and they were returned to the Council accordingly. He had acted with the greatest good faith, and did not believe that he had done a scintilla of wrong to any one; but he was excessively astounded when by the aid of some gentlemen who were members of the Council he had been held up as a man unworthy of credit, an anonymous circular having been sent round to every member of the profession branding him as a dishonourable man. The Council were now asked to allow the names to appear in alphabetical order. If that plan were adopted it would do away with a great deal of difficulty. There were some gentlemen who lived within a few miles of the College, and he assured the Council (he said it with a great deal of regret) that there had been a great deal of wire-pulling in connection with the elections, and there would still be so if the Council permitted the thing to be done in the haphazard manner in which it had been done in previous years.

Mr. PETER TAYLOR said that for forty-five years the Council had been in the habit of receiving the nominations and handing them down to the different bodies of veterinary surgeons throughout the country according to the order in which they were received by the Secretary. He could not see why that plan should be deviated from, and he would propose as an amendment "That as the Secretary receives the names so shall they be entered upon the voting paper."

Mr. GREAVES seconded the amendment.

General Sir FREDERICK FITZWYGRAM said that to his mind the whole matter was immaterial, but when they could by a very trivial alteration lessen the grievances and dissatisfaction which had occurred he thought the Council would do wisely to adopt Mr. Simpson's proposal.

Mr. PETER TAYLOR observed that in order to maintain harmony in the Council he would withdraw his amendment.

The motion was then put and agreed to.

Mr. J. F. SIMPSON said the next proposition he had to submit to the Council was "That the Registrar be instructed to proceed with the work of revising Register No. 1 forthwith, under power given him for that purpose by Section 5 of the Veterinary Surgeons Act, 1881." The work in connection with the revision of Register No. 3 had been well carried out by Mr. Hill, with the assistance of the Solicitor, and he thought that the revision of Register No. 1 should now be proceeded with. There were a large number of members that circulars and letters failed to reach. It might be thought that it be left to the discretion of the Registrar in proceeding with the work whether he should assume that all the returned circulars were from men who were dead or had ceased to practice. He hoped that the revision would be finished in time for the Register which would come out in 1890.

Mr. BRIGGS seconded the motion.

The PRESIDENT asked whether the Council did not think that the matter should be referred to the Registration Committee.

Mr. J. F. SIMPSON contended that it should not be so referred.

The PRESIDENT said that the only way of dealing with the matter would be to send a circular to every member of the College.

Mr. J. F. SIMPSON said that it would only be necessary for the Registrar to commence by communicating with some four or five hundred people. The names of the men on the voting papers which were returned through the Dead Letter Office would be those with whom to communicate. He did not mean to say that because a man did not return his voting-paper the Registrar was to communicate with him.

Mr. THATCHER said that it would be against the spirit of the Act to send to every member of the College, but he thought that some such suggestion as that of Mr. Simpson's might be adopted.

Sir HENRY SIMPSON said he should imagine that on many occasions when voting-papers had come back the Registrar had reasons to believe that members were either dead or had ceased to practise, and it was as well that those names should be removed from the Register. Of course it was not necessary to go about the matter in a wholesale fashion.

Mr. GREAVES, in supporting the motion, said he thought the Council would do well to adopt it. He was continually being told that the present condition of the Register was anything but satisfactory. The whole thing might be remedied at a very little expense.

Dr. FLEMING thought the object of the motion was a very good one. The voting-papers which were returned would, he said, be a very good basis upon which to work, and he would suggest that they be retained so that the Registrar could act upon them, and have circulars sent out according to the Act of Parliament.

The motion was then put to the meeting and carried.

Mr. WILSON said that as the new County Councils were now coming into power he would suggest that a copy of the Register be sent to the clerk of each County Council throughout England. It was most desirable that the local authorities should know who were properly qualified veterinary surgeons and who were only registered practitioners.

Mr. CARTLEDGE, in seconding the motion, said he thought the matter was

one of great importance. Hitherto they had hidden their light under a bushel, and now that such an opportunity arose the College should no longer be quite so modest as it had been.

Mr. J. F. SIMPSON remarked that the Finance Committee had decided that the proposal made by Mr. Wilson should be a recommendation to the Council.

Professor BROWN said that under the new system the Council might reckon that something like four hundred registers would have to be sent out in Great Britain alone. He would forward a list to the Secretary.

Mr. CARTLEDGE said that the College had the money at the bank, and he did not know that it could be expended to a better purpose than sending out Registers in the way suggested. The Registers would be referred to on many occasions, and a matter of £50 or £60 ought not to stand in the way.

Professor BROWN said that frequently communications were received from the local authorities, stating that they had appointed some one as Veterinary Inspector. It was the duty of one of the clerks to see what the qualifications of the individual were, and it was constantly found that he had none at all. The authorities had no means of knowing the qualification of men without referring to the College Register.

Sir HENRY SIMPSON said he thought Mr. Wilson's proposition would be a legitimate advertisement. The Registers this year had cost 3s. 6d. a-piece, and a bill had just been passed for new type. He contended that they paid too dearly, especially as they had purchased the type. That was old-fashioned business, and if the Council were going to give away 400 Registers he would suggest that estimates be obtained from some enterprising firms like Waterlow's or Spottiswoode's.

Mr. WILSON said that with regard to the question of expediency in the matter, if it was to be of any good, the quicker the Registers were sent out the better, because appointments would be made very shortly.

Sir HENRY SIMPSON asked Mr. Wilson to alter his resolution in the following manner:—"That a Register be sent to each local authority in the United Kingdom under the County Councils' Act, and that tenders be obtained and submitted to the Finance Committee at the earliest possible moment, and that they be instructed to accept the tenders or any tender they think desirable."

The PRESIDENT observed that if the Registers were to be sent out quickly surely the type already standing could be dealt with quicker than having it all re-set.

Dr. FLEMING thought the Council ought to arrive at some information as to the cost of the Register; 3s. 6d. was an enormous price.

General Sir FREDERICK FITZWYGRAM, in fairness to their present printers, reminded the Council that the cost per copy varied with the numbers required. Only 200 copies were printed on the last occasion. If 400 copies were printed they would not have to pay at anything like the rate they should pay for 200.

Mr. BRIGGS observed that there was no necessity to publish the Act of Parliament and the Bye-laws.

Mr. WILSON then moved the following amended resolution: "That a copy of the Register from page 103 to page 269, with a copy of the Act, be sent to the local authorities in Great Britain, and that tenders be obtained and submitted to the Finance Committee, who shall have power to accept such tender as they think best."

Mr. J. F. SIMPSON moved as an amendment: "That intimation be given to the members of the profession that Registers can be obtained from the College by those veterinary surgeons who desire to send one to their local

authority," and then going on with the latter part of the motion. He thought £100 was a tremendous amount of money for the Council to vote away.

Mr. WILSON said he did not anticipate that the cost would be anything like £100, or even £50.

There being no seconder to Mr. Simpson's amendment, the PRESIDENT put the motion to the Council, which was carried.

Obituary.

The SECRETARY read the obituary list.

Nomination of Scrutineers.

On the motion of Mr. CARTLEDGE, seconded by Mr. WOODS, it was agreed "That the same gentlemen who officiated last year be asked to act as scrutineers this year."

Mr. J. F. SIMPSON asked what were the names of the candidates for the Council who had been already nominated.

The PRESIDENT said he did not think it would be policy to mention the names.

Mr. J. F. SIMPSON asked what objection there could possibly be.

The PRESIDENT said he was not obliged to give his reasons. The time of nomination of candidates had not yet expired.

Mr. J. F. SIMPSON took exception to the President's ruling. Would the President inform him when the voting-papers would be sent out?

The PRESIDENT informed Mr. Simpson that they should be sent out according to the bye-laws.

A hearty vote of thanks was passed to the President, and the proceedings terminated.

LINCOLNSHIRE VETERINARY MEDICAL ASSOCIATION.

THE seventh annual meeting of this Association was held on March 28th, at the George Hotel, Grantham, Mr. C. Hartley presiding. There were also present Mr. B. Freer (Vice-President, of Uppingham); Messrs. W. H. Brooks (Fulbeck), W. G. B. Dickinson (Boston), R. T. Hardy (Sleaford), J. MacKinder (Peterborough), T. J. Marriott (Bottesford), T. A. Rudkin (Grantham), J. Smith (Huntingdon), F. L. Gooch (Hon. Sec., Stamford), and Capt. B. H. Russell (Hon. Treasurer, Grantham). The minutes of the last meeting were taken as read.

The CHAIRMAN, in alluding to the small attendance to-day, said it was no doubt owing to, or at least very materially affected by, the other meetings of similar Associations clashing with it, viz., the North of England Association, and Carlisle, and Southern Counties. It would have been as well to have taken care to fix their own meeting for some other day.

Capt. RUSSELL remarked that he really thought the date of the holding of the meeting had been fixed as much as anything for a personal favour to himself; the proper time was altered to suit his convenience, and the Hon. Secretary had sent out notices accordingly.

The CHAIRMAN proposed that the Secretary be instructed to, in future, acquaint the secretaries of other Associations of the date of the meetings, leaving them to do likewise, with a view of preventing the meetings clashing.

Capt. RUSSELL seconded, and it was agreed to.

The SECRETARY read letters of apology for non-attendance from Messrs. Thomas Greaves (Manchester), Mr. Wragg (Vice-President, London) F. A. Gresswell (Peterborough), Prof. Walley (Edinburgh), F. Spencer (Wragly), H. Howse (Lincoln), J. Robinson (Market Deeping), and Prof. Williams (Edinburgh).

A letter from Mr. G. A. Banham, of Cambridge, was read, asking for the support of the Association for his election to the Council.

Mr. F. SPENCER, of Wragly, sent in his resignation as a member of the Association, on the ground of the meetings being held at an inconvenient time.

On the proposition of Capt. RUSSELL, seconded by the CHAIRMAN, it was resolved not to accept Mr. Spencer's resignation until the Secretary had written that gentleman.

The accounts were next presented by the Hon. Treasurer, Capt. B. H. Russell, J.P. They showed cash in hand, £12 17s. 8d., and a balance in the hands of the Treasurer of £1 13s. 1d.

It was agreed unanimously that the accounts should be passed, and Capt. Russell was thanked for his services.

On the motion of Mr. MACKINDER, seconded by Mr. MARRIOTT, it was decided unanimously to expel several members who had failed to comply with the rules by the non-payment of entrance-fees and subscriptions to the Association.

Mr. FREER proposed that the next place of meeting should be Boston. This was seconded by the CHAIRMAN, and agreed to.

The election of officers for the ensuing year was then proceeded with.

Mr. J. MACKINDER had very great pleasure in proposing as President one of the most regular attendants at their meetings, although he had to come from a most difficult place of access. He was sure they would all welcome the name of Mr. Freer, of Uppingham. (Applause.)

The CHAIRMAN seconded. Mr. MACKINDER had taken the words out of his mouth he had intended using as to the difficulty Mr. Freer had in getting to the meeting. He had all the more pleasure, therefore, in seconding the motion.

The SECRETARY (Mr. Gooch) warmly supported the nomination of Mr. Freer He was a good and useful member and regular attendant, and without the least hesitation had supplied the Association with a good paper at short notice. (Hear, hear.)

The proposition was put and carried.

Mr. FREER, in returning thanks, said he was extremely pleased at the very flattering terms with which his nomination had been seconded and supported. He could only promise them all that as President of the Association he would do his very best for its interests, and he hoped they would have good meetings and profitable discussions as a result of some valuable papers which would be read. He was very proud to become President for the ensuing year.

The CHAIRMAN proposed that Capt. Russell should be again appointed Hon. Treasurer. He had certainly manipulated the accounts with the ability of a Rothschild. (Laughter.)

The SECRETARY seconded, remarking that in his opinion Capt. Russell was the right man in the right place.

The motion was carried.

Captain RUSSELL returned thanks, and promised to do the best he could whilst holding the office.

The CHAIRMAN said the next officer they had to elect was one of the hardest working of all in connection with the Association, and that was the Hon. Sec. He begged to propose for re-election Mr. Gooch, who, he was sure they would all heartily agree, had carried out his duties in a most excellent manner. (Hear, hear.)

Mr. FREER seconded, and endorsed the sentiments already expressed by the Chairman.

Captain RUSSELL had great pleasure in supporting the motion. Although he had reason to think that Mr. Gooch intended to resign at the meeting, or at least had intimated that he was desirous of being relieved from the post, he trusted that he might be prevailed upon to continue the office for at least another year.

The resolution was then put to the meeting, and carried unanimously.

Mr. GOOCH said he came there with the intention of not being again elected as Hon. Sec. He had had the privilege of holding the office for two years, and he was strongly of opinion that it would be better if the officers were spread more over the members of the Association. Still, if it was the unanimous wish of the members then present that he should again take office, he could only say that he would accept the post, and would continue to do his best to further the interests of the Association whilst he held it. (Hear, hear.) There was always something cropping up in the way of work that wanted attending to, but he was, as he before remarked, ready to do what he could.

Mr. MACKINDER proposed that Mr. Hartley be appointed a Vice-President of the Association. This was seconded by Mr. RUDKIN, and agreed to.

Mr. GOOCH proposed Mr. Brooks, of Fulbeck, as a Vice-President. The CHAIRMAN seconded.

Mr. Brooks asked to be excused the office, and the motion was not put.

On the proposition of the CHAIRMAN, seconded by Mr. SMITH, Mr. Dickinson was unanimously elected a Vice-President.

Captain RUSSELL proposed, and Mr. DICKINSON seconded Mr. J. Smith as Vice-President, and he was unanimously elected.

An interesting and instructive paper was next read by Mr. W. G. B. Dickinson, F.R.C.V.S., on "The Disease in Lambs and Calves known as Husk or Hoose," as follows:—

MR. PRESIDENT, VICE-PRESIDENTS, AND GENTLEMEN,

The subject of my paper has been known by the name of "Hoose," or "Husk," affecting sheep, lambs, calves, and yearling beasts. It is an irritable condition of the respiratory organs, due to the presence of a parasite known as the *Strongylus* filaria, giving rise to a hoosing, husky cough, in some instances terminating in Broncho-pneumonia and death.

It is also known to ourselves as Phthisis Pulmonalis Seminalis, and generally as Filaria Bronchii.

Young animals are more frequently the victims than those of mature age. If the animals are badly fed the parasites soon cause death, whereas those in robust condition very often are enabled to withstand the trouble caused by the parasite without any treatment medicinally.

The symptoms are very noticeable to the careful observer. When Hoose is the condition, or the lungs are affected, the lambs will be seen coughing spasmodically for several seconds, or even minutes; the least effort, even of rising from the recumbent position is sufficient to bring about this distressing paroxysmal cough, let alone the fact of the sheep being excited and hurried by the dog.

The eyes present a sunken, congested appearance; respirations accelerated; there is a mucous discharge from nostrils; the wool becomes harsh and dry, losing its natural oily feeling; there is great thirst and loss of appetite; the temperature is elevated to 106°, 107°, and sometimes 108°; extreme debility, gradual emaciation, and death. If diarrhœa is also present it is reasonable to expect the alimentary canal is also infested with parasites, the *Strongylus contortus*.

The cough is not always the same in character; sometimes moist, and other times dry—generally moist, when the respiratory organs are in trouble from a preponderance of mucus being thrown out and expectorated. The

dry cough is mostly heard when the stomach and intestines harbour these parasites, and is probably due to the salivary glands secreting very little saliva, hence dryness.

Parasitic disease is found to be most abundant in wet seasons, especially in low-lying, damp districts, particularly in the Fens; not, as some have said, in the Marshes, for these districts possess almost an immunity from it, owing, doubtless, to nutritious pastures and great quantities of salt, which abound naturally in the soil and herbage.

I do not pretend to say cough is always indicative of the presence of parasites, because I have noticed on several occasions a flock of lambs coughing, purging, and losing flesh, terminating in death, when these symptoms have been caused, beyond a doubt, by dietetic errors.

Upon opening the stomach we find an absence of parasites, and inflammatory patches in the rumen reticulum, and especially in the abomasum, with a peeling off of the stomach coats and inflammation of the smaller bowels. We find also concretions of maize, cotton cake, and the outer covering of beans in the stomach, showing the highly stimulating and indigestible nature of this artificial food, the using of which is absurd, particularly the use of cotton cake and lamb foods containing peas, beans, and maize, the suitability of which as forms of diet for young ruminants I greatly question.

There are quantities of fine healthy lambs and calves killed annually from these causes alone. I once saw seventy lambs dead in three days from one flock after being fed in this manner for a week. The symptoms presented in a great measure Husk, and I was consulted as to the treatment by the owner on this supposition.

I have, gentlemen, purposely avoided offering any opinion as to the life history of the parasite, or its mode of access to the lungs, as since October last I have furnished Professor Brown with subjects, soil, and worms (earthworms), from different parts of Lincolnshire, for investigation, and when his valuable researches into these hidden mysteries are complete publicity will be given to them, when we can further debate on what will be an established cause.

I can only say that the natural host of the filaria has been found in the common earth-worm.

It is found by cutting the earth-worm into small segments, and squeezing the contents on the slide, adding a drop of water, mixing well, and spreading out thinly all over the slide, and by examining it under an inch objective, when probably you will perceive five or six of the mobile filaria.

With regard to the treatment, we have two methods to consider—prevention, and elimination of that which causes Husk, or Hoose. Let us first consider prevention, which implies a great deal. As to preventing the parasite gaining access into the lungs, it is an impossibility if the animals are pastured on soil abounding with filaria.

The sprinkling of the land with chloride of sodium and soot twice during the summer and once in the winter will suffice to destroy, not only the parasite, but its natural host, the earth-worm.

All sheep pastures should be well under-drained and kept practically dry. Changing the lambs from one pasture to the other is a great essential to prevention. Then comes a most important consideration in the selection of stock from which to breed, free from any strumous taint. The predisposition to suffering is much lessened in the robust lambs and calves, even if they become the host proper of the filaria. They seem to withstand the attack without being much affected. An addition to the nourishment obtained from the pasture may be made in the provision of trough food, consisting of crushed old oats, linseed, caraway seed, and malt cake, with an unlimited supply of rock salt and water.

The curative and eliminative treatment must be chiefly directed towards the reconstruction of a weakened, wasted animal economy, by increasing the quantity of the red corpuscles, which are the great medium of respiration, carrying oxygen from the lungs to the tissues, thus being the respiratory elements of the body.

It is important for us, when prescribing for lambs, to remember that the red corpuscles consist chiefly of hæmoglobin, and this particular constituent is very greatly diminished in man and animals where there is impeded or impaired respiratory function.

Elimination, in the sense I apply it, is that function which will assist the animal in ridding itself of the irritant, which is best accomplished by promoting stimulative expectoration, by which means the cough is greatly relieved. Large quantities of parasites are expectorated, and to a certain extent destroyed, if we employ expectorants which alter the chemical composition of the sputa. Sulphur, iodine, aromatic oils, and balsams, for instance, are excreted as such, or as their products, along with an increased flow of mucus. Most of these drugs, especially the aromatic substances, have an antiseptic, deodorant, and disinfectant effect on the secretions, also on the surface from which they are given off. We term these disinfectant expectorants. Now, it is well to note that if the sputa be altered chemically filaria will also be subjected to metamorphosis. The treatment of Husk may be summed up in a few words. Reconstruct with hæmaturic tonics, which will improve the quantity and quality of the hæmoglobin. I find either dialysed iron or ammonia citrate of iron answer admirably. In conjunction with these tonics eliminate by the aid of stimulating, disinfecting expectorants. Eucalyptus, squills, aromatic oils, and iodine play their part most satisfactorily.

I have tried fumigating with chlorine gas and sulphurous acid, but never met with any permanent benefit accruing from their use.

While the lambs are suffering I recommend them to be placed in a sheltered crewe-yard as soon as the grass gets moist, and kept up until the sun shines on the following day, having trough food for the night consumption.

The *Strongylus contortus* is soon got rid of by the use of p. korisso, ol. felicis, and terebinthine, given daily for three or four days fasting, in conjunction with linseed oil or sol. of gum tragacanth.

As far as my experience teaches me, the intertracheal injection has not been successful in lambs, and if conducted at all, I think it should be preceded by a course of tonic treatment. The mortality is generally greater after the injection than before it. The *post-mortems* revealed the cause of death to be Lobular Pneumonia, an extensive portion of the lung being involved, death taking place early in the attack, as only the engorgement stage had developed, with no sign of hepatisation. In the smaller bronchii large quantities of broken-down *debris* were discovered undergoing caseation, entirely occluding the bronchial tubes.

Looking at the extremely delicate structure of the lung of a lamb, there is no wonder at their inability to admit of pungent liquids being introduced.

Calves do extremely well after injection, and I consider it quite successful, as, with only two exceptions, I have never seen it fail, but completely cure some very bad cases, where recovery seemed almost impossible. The older the calves, the sooner is the manifestation of improvement. The treatment may be repeated daily for three or four days, then every third or fourth day. I would suggest, if a lot are to be injected, for two or three syringe-points to be employed, and constantly dipped in a solution of perchloride of mercury, 1 in 200, thus preventing the formation of abscesses at the point of puncture, causing difficulty in swallowing, and serious constitutional disturbance from

systic injection. It has been the custom since time immemorial to insert a seton into calves when they begin to cough, and, indeed, many stock-breeders have it done to prevent them coughing. Benefit is certainly derived after they are setoned, which is probably in a measure due to the manner in which they are housed and fed.

In conclusion, gentlemen, if the treatment of lambs is conducted on the principles I have advocated I am confident it will prove successful. It answers equally in young calves, but the older ones require the injection treatment.

In most cases, before giving any opinion as to the probable duration of the period required for treatment, if possible make a *post-mortem*, when the condition of the lung will give an idea of the length of time the parasites have existed.

At the conclusion of the paper the Chairman said it was a very interesting and practical essay. He called upon Mr. Brooks to open the discussion.

Mr. BROOKS said he quite coincided with the views of the writer of the paper.

Captain RUSSELL remarked that he certainly thought their thanks were due to Mr. Dickinson for the very able manner in which he had drawn up the paper. With regard to the host of the filaria, it was thought so far back as 1871 that it was to be attributed to the common house-fly. There was one part of Mr. Dickinson's paper in which reference was made to the peeling of the coats of the stomach of ruminants. He thought it was a common occurrence when making *post-mortem* examinations on that order of animals for the coats of the stomach to peel off. Asking simply for information, he would put it to the meeting as to whether or not it was the opinion of the members present that if they made a *post-mortem* of a ruminant, say six or eight hours after death, the stomach would not peel off. With regard to intertracheal injection, he must confess that he had had but a very slight experience. That experience, however, confirmed the view held by Mr. Dickinson, and so well described by him in his able paper. Alluding to some remarks by Mr. Dickinson, at the conclusion of his reading, upon the prices charged for attendance and medicines by some practitioners, Captain Russell said he found that if he sent out the medicines required the farmer generally administered them to the animals. After some further remarks upon the prices charged for various things, Captain Russell reminded the members that there was now a marked improvement in the fees charged and the status of the profession altogether since that Association, and others of a similar character, came into existence. In conclusion, he thanked Mr. Dickinson for his very able paper, and expressed the hope that in the course of twelve months some useful revelations would be published as a result of his discovery of the host of the filaria in the common earth-worm. (Hear, hear.)

Mr. MACKINDER said he had himself read a paper on the same very interesting subject, when at college, twenty years previously. The main question had always been where had the parasite come from? These filaria, if taken and examined carefully, would be found to be both oviparous and viviparous. Many of them were found in the grass on certain soils, but not, as Mr. Dickinson had justly remarked, in marshy districts, because of the salt contained therein. He had not had much practice with regard to the inter-tracheal injections, but quite agreed with Mr. Dickinson on the subject. He always found it to be a much better plan, however, to build up the structure of the animal. There was even then an almost certain after result to be looked for, in the shape of Blackleg. The speaker concluded with quoting the prices he charged for various medicines, etc.

Mr. FREER thought it was a very valuable paper, and was firmly of opinion that there was a very large amount of experience compressed in it. His own

practice had led him to the conclusion that if Hoose, or Husk, were taken in time, and the lambs were put up and given artificial food, they generally got over it. He quoted a case in which this treatment had been successful. Upon the subject of the peeling of the coats of the stomach after death, he found that to be the case, more especially where there had been acute inflammation of the various parts. In certain cases, or he might say in many instances, where the disease occurred, it was absolutely necessary to use the inter-tracheal injection. He gave an instance of having administered the injection to thirty-six animals, and spoke of its beneficial effects, at the same time handing round his instrument to the assembled members for inspection. Speaking of setoning, Mr. Freer bore testimony to its beneficial effects. He did not himself use tape, as was usually done, for the operation, but he got an old sugar-bag, and took the trouble to pull it thoroughly to pieces, and then plaited up the strands two or three thick.

After a few remarks from the CHAIRMAN, in the course of which he stated that he had used the injection in about ninety lambs in an hour and a half or an hour and three-quarters.

Mr. GOOCH, the Hon. Secretary, said it was very seldom that he had had the pleasure of listening to such a perfectly complete and interesting paper as that which had been read by Mr. Dickinson. Having stated what prices he usually charged for certain drinks, etc., mentioned in the course of the discussion, he went on to remark that in the matter of drinks he generally gave them for two mornings in succession, then ceased the third, and administered another again on the fourth morning. He used tape when setoning.

The CHAIRMAN said he himself found horsehair cord very good for the purpose.

Mr. SMITH thanked Mr. Dickinson for his paper, both for the matter contained therein and also for the manner in which he had put it before the meeting. He quite agreed with the writer in his statement that it was far better to keep stock which were suffering from the filaria in dry quarters, and proceeded to name various remedies which he considered best at such periods. He mentioned fees charged in his neighbourhood by himself and others.

Mr. RUDKIN was of the same opinion with Mr. Dickinson as to the cause of the disease forming the subject-matter of his essay. It was particularly so in that neighbourhood, more so where sheep were run thick together. He thought a great deal of it was due to turning out the young animals too soon. If the turning out were deferred until there was new feed for the animals they would very often escape the disease altogether. As regarded the lamb food, he was of opinion that some of it did more harm than good. He could, however, recommend MacKinder's lamb food, and had found in many instances that young animals did well upon it.

The CHAIRMAN then called upon Mr. Dickinson to reply to the discussion.

Mr. DICKINSON was warmly applauded on rising. He disclaimed the idea altogether of his being the discoverer of the host of the filaria. Some fifteen or twenty years ago mention was made by Cobbold of the earth-worm as being the probable host of the parasite, and this had led him to make the search for it, with the result already described. And even now they only knew the intermediate host of the filaria, but before long he hoped something more definite would be arrived at. As regarded eggs, or ova, no mention at all was made. He had not discovered any on the slides of the microscope, but simply found the mobile worm; and it would be seen that this was very active indeed when first squeezed upon the slide. He thought that the way in which the parasites were transferred to the beast was from their lodgment underneath the blades of grass. They were taken into the system by the mouth. As to any other means of access or cause, he did not believe in it

at all. For setons he used hemp and horsehair, which he thought could not be beaten. He recommended the use of a cork on the point of the instrument. He thanked them cordially for the manner in which they had received his paper.

Capt. RUSSELL said he had a proposition to make, and that was that the best thanks of the meeting be given to Mr. Dickinson for his paper.

Mr. GOOCH seconded. He was sure that it had been a most instructive essay, and he thought they had all learned a great deal from it.

The CHAIRMAN supported, and the motion was warmly accorded.

Capt. RUSSELL said he wished to make a few remarks upon the subject of the elections to the Council of the Royal Veterinary College. There had been for some short time past an understanding amongst the different Associations, of which that was one, for a particular member to be nominated each year. That nomination was, according to the mutual understanding arrived at, to receive the support of each of the several Associations to which he referred. The agreement entered into by them was to support one another, and to support the candidate selected by each Association every year. They (the Lincolnshire Association) had supported most heartily the candidates who had been selected by other Associations, but when it came to their turn last year—when they did him the honour of selecting him as the candidate—the other Associations failed to carry out the agreement entered into. The consequence was that he received 418 votes only. There must be some reason, he thought, why these other Associations had not backed up the nomination, and he should never again offer himself for election. He wished to put a name before them, however, and to ask for their support, leaving the other Associations to do as they pleased in the matter. He should like to ask the meeting how they could reconcile what had been the performances of the other Societies mentioned with their previous promises. There was not a doubt but that if the nomination last year had been backed up as it ought to have been he would have been elected. His politics with respect to the Council were pretty well known. He had nothing more to say on that point, except to request them to most heartily support Mr. F. Blakeway's nomination for membership to the Council of the Royal College of Veterinary Surgeons. After referring to his views with regard to the Council, which, he thought, should be composed wholly of practical men, Capt. Russell concluded by again urging those present to support Mr. Blakeway.

Mr. MACKINDER said the last speaker had really taken the work out of his hands. As they were all aware, the Lincolnshire Association combined with other similar Associations for the purpose of securing a member to represent them on the Council. They (the Lincolnshire Association) had kept faithfully to their pledge, but it was clearly manifest that the others had not. However, he had good reason to know that if Capt. Russell would but allow himself to be again nominated for the post he was quite sure that he would be elected. He had pleasure in nominating Capt. Russell for the Council.

Capt. RUSSELL said that he had no intention of standing. That was the fourth time he had been nominated, and there must be a reason—something in the background—and he was under the painful necessity of asking Mr. MacKinder to withdraw his proposition.

Mr. DICKINSON said he had expressed great surprise at the non-election of their friend Capt. Russell in the previous year. He quite agreed with Mr. MacKinder that he ought to stand again.

The CHAIRMAN seconded Mr. MacKinder's motion, stating that it was apparently the unanimous wish of the Association that Capt. Russell should stand.

The motion having been put and carried—

Capt. RUSSELL, rising, said they really had misunderstood him. He was extremely obliged to Mr. MacKinder and his seconder for their kindness, but he did not intend again to offer himself as a candidate for the Council.

Mr. MACKINDER thereupon reluctantly withdrew his motion, and the Chairman said Capt. Russell must take the motion, then, as a vote of confidence in him by the members of the Association.

It was then agreed to support Mr. Blakeway's candidature in the usual manner.

Pathological specimens were exhibited by the members, and Mr. Dickinson had on view a microscope with some interesting objects.

Votes of thanks to the President and officers brought the meeting to a close.

Dinner followed, Mr. Hartley occupying the chair, and a pleasant afternoon was spent. F. L. GOOCH, *Hon. Sec.*

THE CENTRAL VETERINARY MEDICAL SOCIETY.

AN ordinary General Meeting of the above Society took place at the First Avenue Hotel, on April 4th, Mr. Alfred Broad, the President, in the chair, and present twenty-five Fellows of the Society and seven visitors.

The PRESIDENT said, before calling upon the secretary to read the minutes, he wished to heartily welcome those members of the Southern Counties Veterinary Medical Association who were present, and he hoped they would have a pleasant evening. Professor PRITCHARD, ex-president of the Southern Counties Association, having responded, and the minutes being confirmed, the secretary read letters of apology for non-attendance from Professor Walley and Mr. Henry Withers.

Mr. F. W. STANLEY, M.R.C.V.S., of Old Kent Road, London, was unanimously elected a Fellow of the Society, and Mr. Alfred Prudames, M.R.C.V.S., of Berkhampstead, and Mr. H. C. Legge, M.R.C.V.S., of Dorking, were nominated for Fellowship.

Mr. WILLIAM HUNTING then read his Paper on "The Teaching and Examining of Candidates for the Diploma," as follows:—

MR. PRESIDENT AND GENTLEMEN,—It is in no spirit of fault-finding that I have brought this question before you. For many years it has been one in which I have taken great interest, and which has never, I think, been satisfactorily discussed.

With the details of teaching in our veterinary schools I have neither wish nor right to meddle, but it is impossible to consider the whole question of examination without a reference to the teaching.

I am asking your attention to what is one of our most practical responsibilities. We, as members of the profession, are vitally interested in the quality of man we admit to our ranks. With us it lies whether he shall be a credit or discredit to us, whether he is the kind of man who will add to our general knowledge, do justice to his client, and honour the diploma by which we recognise him, and by which we recommend him to the public. Our name and title is now by Act of Parliament a right and a privilege—no man may assume it. The State has conferred upon us a privilege, and we must acknowledge our duties; the greatest of which is to keep the standard of intelligence and knowledge possessed by its members at a level proportioned to the duties we have to perform, and the privileges with which we have been invested. We submit all candidates for the diploma to a test. This test is carried out by a board of examiners, who are selected by the Council. The method and quality of examination is decided by the Council, and we, the members of the profession, are responsible for the actions of the Council. If each individual member fails to form any idea of the way in which our Council

should act, or if he form an erroneous idea we shall certainly he punished for it in the course of time by the natural effects of errors committed by our representatives. I think that our existing arrangements for the admission of men to the profession are positively evil. Whether I am right or wrong, I feel quite certain that no question is more worthy of our earnest attention.

Whatever subjects we require our examiners to test a candidate's proficiency in, those the schools must teach. Whatever standard of excellence we require the average candidate to reach, will be the level of the school teaching. So that practically, we control the quantity and quality of the teaching. We do more; by the arrangement of our examinations we interfere with the method of teaching, and thus we incur a serious responsibility. It is quite possible for the Council to so arrange the subjects of examination and their order as to compel a system of teaching injurious to the student, unfair to the schools, and detrimental to the profession.

I have arrived at the conclusion that this condition has been reached, and that it is necessary to revise the whole subject of our professional examinations before it does serious harm. Of course I shall be told that this has quite recently been done, that the revision was carefully carried out, and that the very best available evidence and intelligence was brought to bear upon it. I shall be told that the interests of the students, the schools, and the profession were all represented on the Council that adopted the existing regulations. I shall also be told that frequent changes are productive of disorder and inconvenience, and that we should give a fair trial to the new arrangements.

I quite appreciate the force of these arguments, and I may say that their weight would be even greater in the Council-room than at this meeting, because in that room legislative progress is only possible by compromise between the various interests represented, and it is not improbable that such compromise may have missed the mark—nay, it appears even probable, when we consider that the Council may be roughly divided into two classes, examiners and teachers, who, from previous associations and unconscious bias, would naturally propose no radical change; and practitioners and others who, from their training and position, cannot be expected to have very definite ideas about teaching or examining. At any rate, gentlemen, I shall ask you to put aside the argument that because certain arrangements exist, they are the best. The "survival of the fittest" is a true expression of natural law; "that we cannot stand still," is but another phase of the same thought. Our environments alter, and we must alter with them or we shall become unfit. I do not say the profession is becoming less fit for its work and its position, but I do say it might be more fit, and I believe one obstacle to improvement is our method of examinations.

If we trace the origin of the examinations for the Diploma, we find that they are the result of gradual development, they have not been arbitrarily imposed. They commenced on the simplest basis, and have been gradually modified and added to. The first veterinary school was in existence over half a century before a Charter was given to the profession; and our examination is the lineal descendant of the test applied to the six-months student who left Camden Town in Professor Coleman's time. Slowly and gradually the standard of proficiency has been raised in proportion to the growth of the profession, and the demands made upon it by wider public recognition; in proportion also to the educational advance made by other professions. New subjects have been added to those which were once thought sufficient. Botany, Morbid Anatomy, and Therapeutics are comparatively recent additions. Chemistry, physiology and pathology have been so added to and extended by modern research, that they require almost double the attention from the student than was given to them thirty years ago, and proportionately our examiners have raised their standard of proficiency. All these additions

and extensions necessitated a longer period of study, and a re-arrangement of the teaching curriculum. This the schools have supplied, and I am bound to acknowledge that they have neither been slow to recognise what was of advantage to the student, nor tardy in affording the requisite improved tuition.

And here I would just say a word concerning the relationship of the schools to the body-corporate. They are inter-dependent and absolutely necessary to each other. Before the passing of the Veterinary Surgeons' Act, every attempt to make any alteration affecting the schools was powerfully checked by threats of obtaining independent licensing powers. Progress was made with difficulty, and by compromise which almost rendered the change of no value. It is different now, and the opposition of the schools can only take the form of action on the Council. This quite legitimate action must be expected and must be provided for.

The interests of the schools and the profession are not always identical. We have no special desire for the influx of large numbers of new recruits; they have every interest in obtaining new entries, and also in rapidly passing them through their establishments into the ranks of the profession. We want the highest quality of member we can get; the schools necessarily send us various grades, and cannot be expected to look favourably upon any test which sends back upon their hands many rejected candidates.

There are four schools, and it may be argued that the natural result of competition will be that the one which attains the highest standard of educational results will gain the most pupils; that, therefore, their interests are identical with those of the profession, so far as having examinations which only good men can satisfy. This might be true if all parents and guardians could judge correctly, and if all students desired knowledge as keenly as they do the diploma—conditions we unfortunately have not yet attained.

It is our duty then to arrive at a correct decision on three points—

1st.—What should entitle a man to receive our diploma?

2nd.—How may his knowledge be tested most effectually?

3rd.—Are our methods of testing fair to the student and the schools?

What should entitle a man to receive our diploma? I answer—Exhibition of a certain standard of proficiency in those subjects necessary to make a sound veterinary practitioner. These subjects are:—

1. The principles and practice of veterinary medicine and surgery,
2. Anatomy,
3. Physiology,
4. Chemistry,
5. Materia Medica and Therapeutics,
6. Botany and Hygiene.

The principles and practice of veterinary medicine and surgery.—This branch of study is better indicated by the word pathology used in its older and wider sense—the study of disease. I include in it the modern branches described as pathology and morbid anatomy. The subject is too extensive to be disposed of at one examining table. To divide it into horse pathology and cattle pathology I consider an inconvenient division, as it must lead to the repetition of questions, and too often to some contradiction. Doubtless it must be divided, and as our practitioners seldom combine an equally first-class acquaintance with the diseases of all animals, some division permitting special knowledge of cattle at one table is desirable. It is also well that the division should be definite, so that the two sets of examiners should not take a student on the same subject merely applied to a different animal. I suggest that a convenient division would be:—

1st.—Medicine, surgery, and pathology.

2nd.—The contagious and parasitic diseases, and obstetrics.

The first would have two examiners, one selected for his special knowledge

of the principles and practice of medicine and surgery; the other for special knowledge of morbid changes and actions.

The second would have two examiners, one a specialist on cattle and obstetrics; the other a specialist on the transmissible diseases.

This arrangement would do away with a special table on morbid anatomy, and conjoin the examiner on that branch with the one on medicine and surgery.

Obstetrics are chiefly applicable to the cow, and may well be looked after by the cattle pathology examiner. The contagious and parasitic diseases are mostly amongst oxen, sheep, and dogs, so that the whole table would specially fit men with experience of cattle. By basing the examination on certain subjects, instead of certain animals, we should avoid the possible repetitions which are equally applicable to any or all animals—such as wounds, fever, fractures, etc.

Anatomy.—There can be no two opinions about this subject. Surgeons, whether veterinary or human, can never know too much anatomy, and our examiners should require a sound knowledge of this indispensable subject.

Physiology is as necessary as anatomy, and I believe is everywhere well taught. At this table histology should be included.

Chemistry is less important than those I have mentioned. Of course, a man cannot know too much of it, but he may buy his knowledge too dear. Our graduates cannot master many sciences, and we had better have a little well learned than a greater quantity only half digested. A sufficiency of chemistry is what will enable a man to understand his physiology, pathology, and materia-medica. I often wonder how the amount is obtained in the time permitted by our first professional examination.

Materia Medica and Therapeutics are certainly worthy of a separate table of examiners. A casual question on drugs at the pathology table is no test at all. We have not the excuse of the medical profession, that the dispensing is done for them by pharmaceutists. We ought to be able to recognise all our drugs, and be able to compound them rationally. As to Therapeutics, we are woefully behind. Unless we test men's acquaintance with what little may be accepted as exact therapeutical knowledge, we shall never emerge from the dismal gloom of simple faith and stupid ignorance which now guides the use and abuse of remedial agents.

Botany and Hygiene.—The latter is an addition which I consider should be made to our test subjects. It is no addition to the teaching, being more or less taught at each school as incidental to some other matter. Hygiene, including, as it does, the stabling, feeding, and shoeing of animals, is quite indispensable, and must be made a systematic part of our studies. Proof of some proficiency in it would prevent the recurrence of the charge that men have obtained our diploma who were more conversant with the tissue changes of disease than with the habits and wants of healthy stock.

Botany is a vast subject, and our graduates only waste time if they attempt to master it as they must physiology. We cannot afford the time; nor is it necessary that the practitioner should know more than is directly applicable to medicinal and poisonous plants, and to the various roots, grasses, and grains used as food. We do not require the minute knowledge of varieties essential to a gardener, nor do we expect the grasp of structural botany which would be expedient if our men were training for biological specialists. I quite allow that a first-class botanical education is invaluable to a man who intends to devote his life to scientific research, and it is of great assistance to the physiologist and pathologist; but the capacity of the average man is limited. You may very easily educate a man beyond his intelligence, but the result is mental confusion. We want clear-headed men who understand what they know, and would prefer them to be narrow rather than shallow.

These, then, gentlemen, are the subjects we require a graduate to show proficiency in, before admitting him to the profession. Very little have I added to existing requirements, but very considerably would I alter the arrangement by which we test them. Now how would my suggestions affect the schools? I cannot answer this question, and must ask the teachers to assist me. All I know of the schools' curriculum is derived from the few pages devoted to the schools in our register. Perhaps I ought to have applied to the principals of the schools for fuller information, but no harm can be done by my negligence.

I have here a table showing what I believe to be of course followed at each school, and I have attempted in the last column to combine the best of the whole number. I have tried to arrange a model course, and I find it differs very little from what practically is done at each school. The difference is rather one of arrangement than extent or number of subjects:—

COMPARATIVE CURRICULUM AT THE FOUR VETERINARY SCHOOLS.
With a suggested Re-arrangement.

School I.	School II.	School III.	School IV.	Suggested Re-arrangement.	No. of Classes
Hippo-Pathology and Surgery.	Veterinary Medicine and Surgery.	Veterinary Medicine and Surgery.	Veterinary Medicine & Surgery.	Veterinary Medicine and Surgery, Morbid Anatomy.	1.
Cattle Pathology.	Cattle Pathology, Morbid Anatomy.	Comparative Pathology and Materia Medica.	Cattle Pathology, Helminthology and Obstetrics.	Obstetrics, Contagious and Parasitic Diseases.	2.
Anatomy.	Anatomy, Materia Medica and Therapeutics.	Anatomy and Pathological Histology.	Anatomy, Morbid Anatomy.	Anatomy.	3.
Physiology.	Physiology & Histology.	Physiology and Histology.	Physiology, Histology.	Physiology and Histology.	4.
Chemistry.	Chemistry.	Chemistry.	Chemistry and Botany.	Chemistry.	5.
Therapeutics.			Materia Medica and Therapeutics.	Materia Medica and Therapeutics.	6.
Biology.	Botany and Helminthology.	Botany.		Botany and Hygiene.	7.
Clinic.	Clinic.	Clinic.	Clinic.	Clinic.	8.
Demonstrations in Histology, in Pharmacy, in Morbid Anatomy.	Demonstration.	Demonstration.	Demonstration.	Demonstrations in Histology, in Pharmacy, in Morbid Anatomy.	Conducted by whole staff and special assistants.

How may a candidate's knowledge be best tested? To merely reply, "Submit him to an examination by experts," is to only half answer the question. We do that now. We might do better. The whole subject of examination is neglected. We leave the matter to our Council, not only with a blind faith, but I fear with a feeling of indifference, or at best with a notion

that it is too complex and technical for us to safely interfere with. We shirk our responsibilities, and call our behaviour modesty. I propose very briefly to examine the whole question, and shall sketch an outline of what I consider should be the answer.

Candidates for the diploma are now submitted to an oral and what is called a practical examination.

The oral is conducted for twenty minutes by two examiners at each table, and I think the arrangement is quite satisfactory.

The practical as now conducted, I have no objection to. The term "practical" is grateful to most men, but it often implies more than it really means. When it was first instituted, our practitioners fancied it was a great advance; comparatively, it was so, but, absolutely, it was only bringing the examination on the practice of medicine and surgery up to the same completeness as other tables. At every table specimens are, or should be, available to ask questions on. The practical is only an oral with the specimens before us. An oral examination on any subject without specimens, may be passed by a man with a good memory and no knowledge outside of books. With them he must identify objects, and show his ability to apply what he has learned. The horses, cattle, dogs and other animals, with the various instruments and apparatus forthcoming at the practical examination, are only specimens suitable for the subject being tested. At no table is an oral examination complete without specimens for identification.

A written examination is the surest and safest way of thoroughly testing a man's knowledge. It gives him time to collect his thoughts, and opportunity for accurate expression of what he knows. No parrot-taught man makes a mark at a written; whilst the slow or nervous man is not flurried. A written examination might be limited to half an hour for each subject, and if the students commenced their papers two hours before the examiners commenced the oral, no difficulty would be found in getting through the work. I am convinced that the average student who works fairly well never has justice done him until a written examination is adopted, and I believe that such a test would do more to ensure really sound education, in contra-distinction to "cramming," than anything we could adopt. If I am right, would not the end justify the means? I ask this, because there are difficulties of detail which may be suggested with great plausibility. A written examination would require more time, it would cause more trouble, and possibly more expense. If, however, it be expedient, we must not let these obstacles prevent us from doing right.

So far, I have arrived at the decision that our test should consist of an oral, a written, and a practical examination by experts, and that some seven different subjects require to be tested. Now clearly all this could not be conveniently conducted at one long sitting, and a division of the test into two or more stages seems advisable. Our Council has seen fit to divide it into three stages, which are respectively carried out at the end of the first, second, and third years of the student's life at college. Whether they adopted this course to facilitate the candidates' admission into the profession a step at a time; or because they thought an examination at the end of each year's tuition might give an impulse to the student's desire for work, I know not. One result of the arrangement is very evident—it compels the school to teach in the exact order of the examinations, and practically limits them during each session to the subjects required at the next test. A division of the examination into two stages seems to me convenient, but I fail to understand why it should be further subdivided, and for reasons I shall state presently, I am convinced the three stages now adopted are altogether wrong.

It is not so long ago that only two sessions at college were requisite to enable a man to present himself before the examiners. When it was deter-

mined to widen and strengthen the examinations, a necessary corollary was an extended school curriculum. The change was made, and ever since confusion and dissatisfaction have become apparent. All the grumbling we have heard is not without reason. "Where there is smoke there is fire," and no doubt students, teachers, examiners, and the profession have not grumbled without cause. My idea is that we have in our recent changes only touched the fringe of the question, and that we have missed the mark because we have not so much faced the subject with a desire for radical improvement, as with a willingness to offer fair play and a desire for quiet. Each section has thought some other was to blame; whereas the whole arrangement is wrong, and the inter-action of ill-adapted parts upon each other has caused friction, and interfered with the smooth running of the whole machine. For the wrong arrangement the Council is to blame; but the schools cannot assume the position of martyrs. They were well represented on the Council, but they failed to see the effects of the new organisation, and allowed the rules and regulations to be formed to their own detriment. The only section I feel any sympathy for is the student, who between teaching and examining has certainly been the victim.

The periods at which examinations are held is another point which should be considered in its bearing upon the schools and pupils. If the body-corporate allow examinations to take place in the middle of a session, then the students will enter college at that date. The classes at college extend from the beginning to the end of a term. Men who enter in the middle hear only the latter half of the course, and thus missing all the earlier teaching, are never able to follow the lectures or overtake the lecturer. It may be possible for a really clever student to overcome this difficulty, but the average man is simply in a fog the whole of his first term, and fails to obtain a connected idea of his subject—even if he does not become disgusted, and permanently join the ranks of the idlers.

A few words concerning our examiners are requisite to complete any comprehensive view of examinations. The selection of an examiner is one of the most difficult tasks our Council has imposed upon it. If it were sufficient merely to find a man who thoroughly understood his subject, and rightly appreciated the amount and direction of knowledge a candidate should possess, with a view to practising veterinary medicine and surgery, the task would not be easy. But more than this is wanted to make a good examiner. There are many men who know, but not many who have the power to determine what others know. The gift of imparting knowledge (teaching) closely resembles the gift of extracting or testing knowledge (examining), and both are not necessarily associated with the possession of knowledge.

The appointment of examiner is now made for five years. I think three years should be the outside time for which we should entrust men with such responsible duties. If they have shown themselves suitable for the office their re-election is simple, but as we have frequently to appoint untried men, we should, by a short term of service, guard against anyone holding the position for the longer period after evidence of unsuitability.

Two examiners at each table is decidedly right. It is not only a guarantee of fair play, but it provides variety of minds—hence variety of questions and greater opportunity for thoroughly testing the knowledge of the candidate. To say that an examiner is only human, is to confess that he is not altogether free from fads and prejudices. Everyone knows how we all possess some disproportionate estimate of the value of certain questions. Students soon detect these weaknesses, and in a year or two intending graduates have collected a long list of what questions and what answers certain examiners hold sacred. These are specially learned by every candidate, and, it is said, have a very favourable effect upon the examiner when they are told off with

an innocent fluency. The presence of two minds at each table discounts the effect of these little peculiarities. The reduction of the five years' appointment to three would also help to qualify the stereotyped questions.

Perhaps the examiners will pardon me for adding just two remarks as to the way they perform their duties. We have no fixed standard as to the extent of knowledge a candidate should possess. There is a wide margin for each examiner to fix as the minimum and maximum value of a question and answer. The sound guide seems to me to be, to keep within limits defined to the utility of the knowledge implied by a correct answer. The candidate is to show fitness for the position of veterinary practitioner, and therefore on some subjects may well be excused the thoroughness which would be looked for in a specialist. I hold that it is more the duty of an examiner to find out what a man knows than what he does not know. He should therefore multiply questions, and not cross-examine on one subject.

Are our methods of examination fair to the schools and student?

From what I have said in discussing the methods most likely to admit only really good men to the profession, you will have anticipated that I think our methods are not fair.

The student would probably not acknowledge the addition of a written examination as a benefit. Men often fail to recognise their own good, and we, who have experience not only of studentship, but of the after life of practitioner, must form our own opinion, and conscientiously act for the good of the candidate. From our point of view a written examination would undoubtedly afford additional security against the admission of men whose knowledge was only superficial, and too probably transient; our further experience enables us to say that even for the welfare of the student a written examination is advantageous—if not presently, certainly in a not remote future. A written examination would also do justice to the honest teacher by indicating very distinctly which men were taught and which were only crammed.

The greatest mischief done by the existing arrangements is traceable to the First or A examination. It tests a man's knowledge of Botany, Chemistry, and Anatomy at the end of his first session. Naturally, students confine their attention merely to these subjects, and teachers limit their instructions to the requirements of the examiners. Let us consider the effects in detail.

Botany.—All knowledge of this subject must be acquired from books and dried specimens. Until summer has come and gone it is impossible for a man to obtain a rational comprehension of the plants and trees, the flowers and the shrubs, which, during the winter, are wholly or partially invisible. Neither student nor teacher can be fairly treated by an examination which limits study to a period absolutely incapable of affording a natural view of the objects studied.

Chemistry.—In the dark days of professional ignorance—in the days when I was a student—we had two sessions in which to study this wide and difficult science. Now, in the days of our illumination we ask men to master it in seven months. Is this due to the greater intelligence of the candidate, or to the greater density of the Council? Surely this arrangement must be injurious to both schools and students. It cannot be seriously argued that even a useful smattering of chemistry can be obtained in seven months, even if every day of the week produced a lecture or a demonstration. I think the study of chemistry should be extended over two sessions, so that sufficient time might be given men not only to swallow, but to digest and assimilate the mass of facts and principles laid before them. During the first session the theory, during the second the practical work in the laboratory would occupy their attention.

Anatomy.—The rules and regulations printed in our official Register do not

use the word anatomy to express the third subject required at our A examination. They say "Elementary Anatomy." Would any educated man imagine that under such a term reference is only made to the bones and ligaments? Does not the term suggest the mixed ideas entertained by our Council? Who, with any real estimation of the value of language or science could have misrepresented the subject by the choice of such a title? The correct expression would be Partial or Limited Anatomy. What other science was ever so arbitrarily divided? Fancy Elementary Physiology being defined as limited to the circulation, or Chemistry being examined on as far as hydrogen and oxygen. If this Anatomical Examination had no greater evil than exhibition of ignorance on the part of its inventors, I should treat it as a trivial mistake; but it has a far wider evil—it limits the teaching for a whole session to this one division. The schools must pass their men; to do so they teach up to the examinations, and so first-year students are anatomically starved on bones and ligaments. I do not hesitate to say that neither the bones nor the articulations can be properly understood without dissection of the muscles, *pari passu* with the study of the other structures. How can a man remember the relative position of bones until he has seen them *in situ?* or appreciate the rationale of prominences and grooves till he has seen the structures attached to or passing over them? How can he learn the mechanism of the articulations—say the shoulder, for instance—when, not ligaments, but the tendons of muscles, play the chief part in fixing and controlling the joint? We should do all we can to brighten and assist the studies of youth. Goodness knows! bones are dry enough reading, and a sufficient tax on the memory even when made intelligible by the relationship of muscles. To debar a man from dissecting until he has thoroughly learned his bones and ligaments is nearly as bad as insisting that a man shall not be allowed to go into the water until he can swim. I do not say dissection of muscles should be commenced by a student absolutely ignorant of the bones; I would let him learn their position, names, and general features, as now. But allowing three months for this, he should then continue their study, assisted by dissection of ligaments and muscles. Two useful purposes would thus be served—he would obtain a more thorough knowledge of the whole locomotor apparatus, and the diversity of occupation would make his work less irksome. So long as our A Examination remains as it is, so long will schools cut their teaching to fit it, and just as long will anatomy remain a subject ill-taught and ill-learned.

I have attempted to show that every subject of the A Examination presents a difficulty in being forced into one session, and could be better taught if the schools were given more time. I see only one logical conclusion, viz., to do away with this test altogether, and only to examine students after they have had two sessions at college. By so doing, we should leave the schools quite untrammelled in their arrangements and methods of teaching; we should allow the student time to thoroughly master his subjects, and we should expect an improvement in the quality of candidates for the diploma.

Our Second or B Examination also affects the teaching by its division and arrangement of subjects. It tests the knowledge of anatomy and physiology. Until the second session at college is entered upon, no physiology is taught, and, consequently, in that seven months' course a man has to be crammed with one of the most important and most extensive of the sciences. No branch studied by veterinary students is more important than physiology. Without a fair knowledge of it there is no hope for any man; without it none can progress or even maintain his place in the general advance of our profession. By forcing physiology into a single session, we equal the teaching and supply an obstacle to learning. We render "cramming" a necessity;

whereas our true object should be to induce the schools to supply instruction to their pupils as a good horseman does provender to his horse—regularly, proportionately, not too much and not too little—so that it may be properly assimilated without fear of plethora or anæmia, let alone the risk of choking or impaction.

Instead of three examinations, I should only have two, and the first at the end of the second session. To the subjects now included in the A and B Examinations I should add Hygiene. This alteration would add nothing to the teaching, would require no additional examiners, and would really simplify the work of the Council, whilst giving the schools a freer hand.

EXAMINATIONS.

EXISTING ARRANGEMENT. 20 Examiners.		PROPOSED ALTERATION. 18 Examiners. Perhaps additional for Written.	
1st Examination (end of 1st Term.)		*1st Examination (end of 2nd Term).*	
Elementary Anatomy	2	Anatomy	2
Botany	2	Chemistry	2
Chemistry	2	Physiology	2
		Botany and Hygiene	2
2nd Examination (end of 2nd Term).		*2nd Examination (end of 3rd Term).*	
Anatomy	2	Medicine, Surgery, and Pathology	2
Chemistry	2	Contagious and Parasitic Diseases and Obstetrics	2
3rd Examination (end of 3rd Term).		Materia Medica and Therapeutics	2
Morbid Anatomy	2		
Diseases of the Horse	2		
Diseases of other Animals	2		
PRACTICAL.		PRACTICAL.	
In regard to Horses	2	In regard to Horses	2
In regard to other Animals	2	In regard to other Animals	2

Our third, or final examination presents little to take exception to, but I hold most strongly that Materia Medica and Therapeutics should be properly tested, and that they cannot be so unless given a separate table of examiners. The effect upon the teaching, of not giving a subject proficiency on the examination list is well shown by this class. Materia Medica and Therapeutics are at nearly every school relegated to a demonstrator, or tacked on to some larger class. Now surely the agents with which we attack disease are well worth some special teaching. Until they receive it we shall remain at the scientific level of calling some drugs alternatives, and some antacids.

The practical test which now forms part of our final examination is necessary and right, but I do not see why it should be conducted by separate men. I think it would be as well done by the examiners—one in the room, and the other in the yard or stable—his chances of failure are increased. Both examinations are on the principles and practice of medicine and surgery; one is the complement of the other, and it seems a very arbitrary division which requires two sets of examiners to complete it.

One more question I must notice, viz., our Matriculation Examinations. The questions set to students on entering college, to test their general education, seem to be just about such as would indicate whether a man possessed sufficient knowledge and intelligence to understand and learn the science necessary to make a veterinary surgeon. From what I have seen of successful candidates, I am certain a very low standard of proficiency is accepted

by the examiners. I should fancy that about 25 per cent. of marks must pass a man. If I am right, this is unfair to the profession at which they aim. The standard of proficiency in general scholastic knowledge should be raised. The answers to such papers as one now given should attain a standard of at least 50 per cent. of excellence.

In conclusion, gentlemen, let me say this is no academical essay, no abstract paper undertaken from feelings of curiosity or instigated by critical perversity. I have simply done my best to lay before you conclusions I have arrived at after some consideration. I have stated the facts and arguments which led me to them. I have suggested the alterations I deem requisite, and it is for you to determine whether or not any further action is expedient. Our examinations guard the portals of the profession, and candidates are remitted or rejected as they approximate to the standard we set up. Our examinations control the curriculum of the school, and to some degree the order and extent of tuition. They play a great part, then, in forming the minds and qualifying the knowledge of our successors. We must feel and acknowledge our individual responsibilities, and if evils exist, we must not allow indifference or fear or favour to stand in the way of right being done.

(*To be continued.*)

THE WESTERN COUNTIES VETERINARY MEDICAL ASSOCIATION.

THE sixth general annual meeting of the above Association was held at the President's residence, Southernhay, Exeter, on March 28th, J. P. Heath, Esq., the President, in the chair.

There were also present Messrs. C. Parsons, Launceston; S. Burton, Torquay; W. H. Bloye, Plymouth; C. H. Golledge, Sherborough; H. P. F. Chase, Tiverton; A. H. Oliver, Devonport; A. J. Down, Sampford Peverell; T. E. Baker, Crewkerne; R. E. L. Penhale, Hatherleigh; J. H. Penhale, Bideford; W. Penhale, Holesworthy; J. J. Clarke, Exeter; and the Secretary.

The minutes of the last meeting were read and confirmed.

Letters and telegrams regretting inability to attend were read from Professor Penberthy, Messrs. Collins, Raddall, T. Olver, Smythe, and others. A letter was also received from Mr. Elder, resigning the Treasurership, a post he had held for some years.

The SECRETARY, in his annual report, stated the Association was making good and steady progress. During the past years the papers and discussions had been interesting and instructive, an excellent feeling prevailed, members were increasing, and the Society was in a good financial position.

Messrs. Pethick, of Plymouth, and Marshall, of Paignton, were elected new members of the Association, on the proposition of Mr. BURTON, seconded by Mr. PARSONS.

Mr. H. Thomas was unanimously elected President for the ensuing year; Messrs. Collins, Heath, Parsons, Burton, and Oliver Vice-Presidents; and W. Penhale Secretary.

A vote of thanks was accorded Mr. Elder for his services to the Association in the past, and Mr. Bloye was elected Treasurer in his stead.

It was resolved that some instruments should be purchased for the use of members of the Association, and that Messrs. Heath, Parsons, and the Secretary form a committee to select and purchase the same.

Mr. F. T. Harvey communicated the singular case of a pony which had died from Strangulated Hernia, through the foramen of Winslow.

A vote of thanks was awarded Mr. Harvey for giving the particulars of so interesting a case.

Mr. BLOYE read the following paper on

Heredity.

Mr. President and Gentlemen,—In spite of Mr. Secretary's assurance to the contrary, I am afraid that my choice of "Heredity" as the subject for discussion here to-day is somewhat unfortunate. Of late it has received so much attention at the hands of kindred societies that one incurs the risk of being considered a plagiarist, and with no personal opinions to offer. Nevertheless, the very prominence which it has recently taken, its great importance, and, above all, the amount of debatable pabulum which it offers, perhaps warrant the introduction, and, it may be, render it worthily and necessarily a subject for consideration by the members of this Society.

Before commencing I would disclaim the idea of putting forward anything new or original, and further would beg your indulgence for the shortcomings of a paper too hastily prepared.

In treating the subject and in seeking analogies I have repeatedly gone to the human subject. With such increased opportunity for collecting statistics as man offers, and the positive evidence which such at times affords, you perhaps will admit that this is allowable.

"Like begets like." I do hope that the phrase has not already been repeated *ad nauseam*, for it is the biological law upon which heredity is built. At the outset I admit that I am a believer in this law to the bitter end. Its force is apparent in all forms of life, constantly and everywhere. Both externally and internally do we find this, for not only features and conformation are reproduced, but bones, internal organs, and circulatory organs (some families have large blood-vessels and others small) are equally under its mighty domain.

Practically, of course, this law is not exact, for, as Darwin puts it, "the number and diversity of inheritable deviations of structure, both those of slight and those of considerable physiological importance, are endless." Yet the law itself stands unchangeable.

"Perhaps the correct way of viewing the whole subject would be to look at the inheritance of every character whatever as the rule, and non-inheritance as the anomaly." Of course, heredity has its opponents, but to ourselves naturally at once the art of breeding suggests itself as an argument of crushing weight in its favour. Among men heredity is specially to be noticed in nervous systems. Galton mentions that intellect and great ability are largely hereditary qualities. His statistics show that great oarsmen and wrestlers usually belong to a very limited number of families, among whom strength and skill were hereditary. Musical attributes are common to families; even trifling peculiarities are sometimes inherited—that of handwriting has frequently been observed.

The laws of heredity are generally summarised as four, viz., direct heredity, reversional heredity, indirect or collateral heredity, and the heredity of influence. An American writer adds three further distinctions: co-equal, prenatural, and initial heredity. However, the first four will probably be sufficient for our purpose. First we have direct heredity. This consists in the transmission of the qualities supplied by *both* parents. This is obviously shown by the fusion of the characters of the parents, as exhibited by hybrids being distinct species or strongly marked varieties among the lower animals, or in the offspring of parents belonging to two strongly contrasted races of men, such as European on the one hand and the negro on the other. From a purely theoretical point of view, this law of *direct* heredity would be the common one, and as described by Lucas "it would consist in the absolute equilibrium in the moral and physical nature of the infant, of the integral resemblances of the two parents, or would equal the exact mean of the parents." As a matter of fact this rarely happens, the rule being that the

influence of one or the other parent prevails in the offspring, and in this regard the tendency to cross heredity, *i.e.*, from father to daughter, or mother to son, appears to be the most frequent. Dr. Carpenter says:—"It has long been a prevalent idea that certain parts of the organism of the offspring are derived from the male, and certain other parts from the female parent; and although no universal rule can be laid down upon this point, yet the independent observations which have been made by numerous practical breeders of domestic animals (both mammals and birds), seems to establish that a tendency has a real existence, the characters of the animal portion of the fabric being especially (but not exclusively) derived from the male parent, and those of the organic apparatus being in like manner derived from the female parent. The former will be chiefly manifested in the external appearance, in the configuration of the head and limbs, in the organs of the senses (including the skin), and in the locomotive apparatus; whilst the latter show themselves in the size of the body (which is primarily determined by the development of the viscera contained in the trunk), and in the mode in which the vital functions are performed. But, however *general* this rule may prove to be as regards the lower animals, it is by no means *universal*; for instances are far from infrequent in which the multiple progeny of one conception, divide between them the characters of the parents in very different modes. Some litters of cross-bred puppies offer an apt illustration of this. It is rare to meet with instances in which *some* distinctive traits of both parents may not be traced in the offspring, these traits showing themselves in peculiarities of manner and gesture, in tendencies of thought or feeling, and in proneness to constitutional disorders. Let me offer as confirmatory evidence on this point, the case of Lisles Geoffroy, an engineer in Mauritius, son of a white man and a stupid negress. Physically he was a negro, with the features and woolly hair of his mother's race, but in moral constitution he was so thoroughly white, as regarded intellectual development, that he was able to overcome the prejudice against him as a negro, and attained to the highest office in the island. Another fact which should here be mentioned is that any peculiarity possessed in common by both parents is almost with certainty transmitted to the offspring. Equally certain is this rule in the case of a diathesis possessed by both parents, and," says Carpenter, "the manifestation of it is likely to be yet more marked if the parents inherit the same family idiosyncrasies."

Next we come to reversional heredity, atavisen, wherein the offspring inherits the peculiarities of its grandparent or even more remote ancestor. Side by side with this we may take collateral or indirect heredity, which occurs between persons and their ancestors in an indirect line, as between uncle and nephew, aunt and niece. Reversion is so common among animals that the term "throwing back" is of daily occurrence. In this connection, too, prepotency is often to be observed, one individual being specially powerful in transmitting his character through several generations. The laws which govern these variations are for the most part unknown. Darwin says, "No one can say why the same peculiarity in different individuals of the same species, or in different species, is sometimes inherited and sometimes not so—why the child of ten reverts in certain characters to its grandfather or grandmother, or more remote ancestor—why a peculiarity is often transmitted from one sex to both sexes, or to one sex alone, more commonly, but not exclusively, to the like sex. It is a fact of some importance to us that peculiarities appearing in the male of our domestic breeds are often transmitted exclusively, or in a much greater degree to the males alone. A much more important rule which I think may be trusted is that, at whatever period of life a peculiarity first appears, it tends to reappear in the offspring at a corresponding age, though sometimes earlier.

Hereditary diseases, and some other facts, make me believe that the rule has a wider extension, and that when there is no apparent reason why a peculiarity should appear at any particular age, yet that it does tend to appear in the offspring at the same period at which it first appeared in the parent."

Then, lastly, we have the heredity of influence, a form which offers many familiar examples and always affords an interesting study. The phenomena in connection with it show that where a mother has previously borne offspring the influence of its father may be impressed on her progeny, afterwards begotten by different parent. The well-known instance of a mare which, once having been impregnated by a quagga, eventually transmitted quagga marks to a succession of horse-begotten colts, will readily occur to you. In the human family this feature is frequently seen, as when a widow, marrying a second time, bearing children with strong resemblance to her first husband. A striking case is recorded of a negress whose first offspring was the child of a white man, and who upon subsequently marrying a negro bore him half-caste children. Perhaps of all men dog-breeders are as fully alive to the heredity of influence as any. The jealousy with which they guard the females prior to their first impregnation is a noteworthy tribute to the theory which it implies. It is the habit to attribute these cases to the mental impression produced by the first male parent upon the female, but a theory is also advanced which suggests that the blood of the female has imbibed from that of the fœtus through the placental circulation some of the attributes which the latter has derived from its male parent, and that the female may communicate these, with those proper to herself, to the subsequent offspring of a different male parentage.

That mental impressions at the time of sexual congress do make themselves apparent upon the offspring, is borne out by a phenomenon which many breeders are acquainted with, viz, "that a strong mental impression made upon the female by a particular male will give the offspring a resemblance to him, even though she has had no sexual intercourse with him." This condition Carpenter accounts for in what he calls "the dynamical relation of mental states to the organic processes."

We next have to consider some of the modifications of the foregoing laws as brought about by various influences, conditions, and surroundings, modifications for which domestication is perhaps solely responsible, for were there no domestication there might possibly have been no exception to heredity.

Non-inheritance might be explained by the fact that strong hereditary tendencies, although existing, are overborne by unfavourable conditions of life; for instance, cart-horses will not transmit their fine physique and great strength if living in cold, damp, or mountainous regions. European dogs in India often fail to transmit their true character, and our sheep in tropical climates lose their wool in a few generations. To summarize under this heading, let me again quote Darwin, who says, "Under domestication we see much variability caused, or at least excited, by changed conditions of life, but often in so obscure a manner that we are tempted to consider the variations as spontaneous. Variability is governed by many complex laws, by correlated growth, compensation, the increased use and disuse of parts, and the definite action of the surrounding conditions. There is much difficulty in ascertaining how largely our domestic productions have been modified, but we may safely infer that the amount has been large, and that modifications can be inherited for long periods. As long as the conditions of life remain the same we have reason to believe that a modification which has already been inherited for many generations may continue to be inherited for an almost infinite number of generations. On the other hand, we have

evidence that variability, when it has once come into play, does not cease under domestication for a very long period, nor do we know that it ever ceases, for new varieties are still occasionally produced by our oldest domesticated productions." Before concluding this portion of my subject, I cannot help referring to one other point. The fact that heredity is specially observable in nervous systems has already been alluded to. Some of the deepest thinkers in following up this subject in its connection with the evolution of the mind, gauge man's moral responsibility entirely by the hereditary influences transmitted to him, and then naturally apply the doctrine in the consideration of the very complex question of "freedom of will." In an extremely clever paper on this subject Dr. Buchan, to whom I am indebted for some valuable notes, writes: "The wicked are not wicked by deliberate choice of the advantages and pleasure of wickedness, but they sin in consequence of a warped inclination of their nature, which makes the evil seem good to them and the good seem evil. Criminals are quite a manufactured article."

There are no accidents in the laws of the universe; there is nothing accidental or supernatural in the impulse to do wrong. Both come by inheritance or education, or probably by a combination of the two. Science cannot believe that the impulses to do right are purely due to the grace of heaven, and the impulse to do wrong to the malice of the evil one. One might say of the true thief as of the poet, "he is born, not made." Everything, however, goes to prove that the large mass of crime is hereditary, and that a man inherits evil passions and propensities, as well as special features. Hence the hopelessness acknowledged by all prison philanthropists of reforming habitual criminals. Now who are the criminal classes? They are a distinct race of beings, inhabiting a distinct quarter of most of our large towns, living in intemperance and vice, closely intermarrying, and propagating a criminal and degenerate stock. Habitual criminals are true moral imbeciles. Many of these criminals are found to be descended from an epileptic or insane ancestry, and crime is often an outlet of their insane tendencies. They would go mad if they were not criminals. Science does not regard man as an abstract being, endowed with a fixed moral potentiality to do right and eschew wrong; and we cannot consider crime in all cases as a simple affair of yielding to an evil impulse or vicious passion, which ought to have been easily controlled. We must recognise a border line between insanity and crime; near one boundary we meet something of madness, but more of sin; near the other boundary we meet with something of sin, but more of madness.

In regard to freedom of will in connection with heredity—If the majority of men were asked, "Is man a free-will agent?" their answer would be emphatically "Yes." But when we come to consider the matter, especially in connection with heredity, there is a great doubt as to whether man is a free-will agent. Heredity is of a fatalistic character. Heredity and freedom of will are in direct opposition to one another. By free will we are ourselves—by heredity of others. Those in favour of freedom of will say, "I have an innate sense of my freedom of will," but they ignore the fact that every mental state is determined by organic conditions, and that this very innate sense of their freedom comes directly under the head of fatalism. It is a very interesting fact in this connection, that statistics show—that all acts commonly supposed to be the result of free will, such as murders, thefts, marriages and divorces, are almost exactly the same year after year. In France, during twenty years, the number of criminals varied only from 8,000 to 6,000. This reference probably amounts almost to a digression, but I have made it in hope of bearing out and clenching the argument, that hereditary influence has scarcely any limit. Personally, I admit that often in thinking

over this subject, the idea will suggest itself—Are not we ourselves, and the animals with which we have so much to deal, simply passive agents in the carrying out of that great law of evolution, in which heredity plays so prominent and subtle a part?

Now, gentlemen, having devoted perhaps too much attention to this portion of the subject, there remains to be treated of the still more important application of it to diseased conditions. If the deductions to be drawn from the foregoing be correct, then how forcible must be the law of heredity in its application to the transmission of disease. In this connection, and in view of recent events, I take it for granted that the interest of the meeting will centre itself chiefly upon the question of hereditary unsoundness in horses, particularly in relation to those affections upon which opinions are varied; and hence it is to this part of the subject that I would direct your attention. Permit me to read you the Council's ultimatum, issued as the result of its appeal to the profession. "Having considered the evidence which has been laid before them, the Council of the College are of opinion that the following diseases shall be deemed to be a legitimate reason for disqualification: Roaring, Whistling, Sidebone, Ringbone, Navicular disease, Curb, Bone Spavin, Bog Spavin, Grease, Shivering, Cataract."

The Council also consider that under certain circumstances the undermentioned diseases shall be deemed to justify the rejection of an animal for breeding purposes—Splint, Stringhalt, Contracted Feet, Bursal Enlargements (such as Thorough-Pin and Windgalls"). I do not feel myself competent to criticise the Council, but one can scarcely help offering the suggestion that the latter portion of the recommendation betrays a want of decision, which is somewhat likely to defeat the end in view.

But to proceed. For convenience I have roughly grouped the conditions referred to into—Respiratory, Nervous, Bone, Bursal, and Blood affections, and in addition a few others which are not easily included in either of these categories.

We will commence with the respiratory division. Roaring and its variations, whether from atrophy of nerve and muscle or from chronic thickening of the mucous membrane, have perhaps received as general a condemnation as any hereditary taint which may be thought of. On the other hand, "Broken-wind" at once sets up a *casus belli*.

My late preceptor, Prof. Robertson, held strongly that Broken-wind was hereditary. Mr. Hunting in discussing the point says "We want more evidence." Doubtless we do to be positively certain about them, but if we go to the human subject and take his nearest analogue to Broken-wind, Asthma, it is evident that the medical profession is decided in its opinion on the point.

Dr. Theodore Williams, in a paper on Asthma says:—"Heredity can be traced in about 40 per cent. of the asthmatics, though the tendency often does not show itself till late in life. The characteristic form of chest is often transmitted from parents to children, and even when this is not so, a disposition toward spasmodic symptoms in catarrhal attacks is often seen in the children of some asthmatics." I believe this quotation is applicable to our equine patients in every line.

The nervous division probably does not admit of much discussion, as for our purpose it includes but Shivering and Stringhalt. Megrims perhaps would readily be admitted as of strong hereditary tendency, but the fact of the impossibility of its detection in an ordinary examination, for the time renders it beyond our pale. "Shivering" is, I think, wisely included in the Council's *positive* list. Except for the disparity in their importance, that Stringhalt should not be also embraced in the same category appears somewhat of a mystery. Granted that the pathology of Stringhalt is involved in

doubt—its nervous origin is unquestioned; and of all the hereditary affections, those of the nervous system stand pre-eminent. Admit this, and a good case for the heredity of Stringhalt is at once made out.

We next come to the "bony enlargements," and among these are the same diseases about which opinions are generally so undivided, that a passing mention of them will doubtless be considered sufficient.

Spavin and Splint have long been recognised as hereditary diseases; notoriously so, too, has Sidebone, an affection well termed a curse among cart-horses in towns; yet one has grown accustomed to hearing heredity ignored, and the unfortunate two-furrowed plough accredited as being the cause of nine out of every ten Sidebones found on agricultural horses.

The hereditary tendency of Ringbone I believe to be almost equally powerful, though there are disputes on the point. Navicular disease, which may perhaps be well included here, is, I think, on all sides now acknowledged in the last degree. I have seen well-developed Navicular disease in an unbroken colt.

Of all the foregoing, Splint is the only disease about which diversity of opinion exists as to the rejection of a sire for breeding purposes. Doubtless, in many—nay, most—cases the risk involved is slight; but what I want to point out is this, the probable existence of a "bony enlargement diathesis"—a condition in which the bones appear to be only waiting for a stimulus to throw out enlargements anywhere.

Mr. Stephenson, of Newcastle, who advocates the same idea, has traced a bony deposit in the blood-vessels of a horse possessing the diathesis.

Truly, the bony enlargements are, as a rule, pretty constant in their reproduction as to situation, yet one at times sees animals in which all the changes have been rung, and inducing the idea that the exostoses develop just exactly in accordance with the amount of exertion devolving upon the various limbs and positions.

What I am leading up to is this, that the possessor of a Splint may probably, though not necessarily, be the possessor of such diathesis, and hence an undesirable animal for breeding purposes.

I moot the point simply as one allowing of consideration. Of the bursal enlargements, "Thoroughpin" has claimed the greatest attention.

Prof. Williams, with a very wide experience among Clydesdales, is particularly strong in his belief as to the heredity of this disease. Personally, I see no reason to believe that the tendency to bursal inflammation and extra secretion is not equally inheritable with many other diseases.

From this standpoint, Windgalls must of necessity be included in the list, though the frequency of the former must be greatly augmented by conformation. Here, let me state the opinion shortly, that distension of the capsule of the true hock-joint—Bog Spavin—is equally transmissible.

Blood Affections.—Certain morbid conditions of the blood seem to be imparted by parent to progeny almost unfailingly. Grease is the most important of these with which we have to deal—and its presence should positively warrant the rejection of it possessor. So, too, I think, should Eczema, though in fairness it should be mentioned that Sir Erasmus Wilson, in speaking of Eczema, says, "It is hereditary only in the sense of the transmission of natural tendencies from parent to offspring, and not by virtue of any special virus or *causa morbi*." Mr. Barford at the Council made a struggle to get Lymphangitis included in the list. I will apply Dr. Wilson's remarks quoted above to this disease, and further say that I think Mr. Barford ought to have succeeded. As bearing somewhat on this point, I may mention that Mr. Fayver, in an article upon "Elephantiasis" in the human subject, says, "Richardson found that of 236 persons, 73 per cent. had one or both parents affected."

Mallenders and Sallenders have been suggested as diseases which are hereditary. I would ask, has it been positively decided that these diseases arise from any morbid condition of the blood or skin? Many believe that they are parasitic in their origin, and until the point is finally settled it is scarcely fair to attempt to decide as to heredity. Perhaps the experience of gentlemen present may help us to a conclusion. Among the diseases of the eyes, we have, fortunately for our patients, not so wide a field for observation, as has the medical profession.

By ourselves Cataract is condemned as hereditary, with an almost unanimous voice; so too, I think, should be some forms of Ophthalmia. As illustrative of the extreme delicacy of the law of heredity in its dealings with the human eye, let me instance the frequency with which even a slight cast, not amounting to squint, in the eye of a parent is reproduced throughout a long family. The heredity of Curb, though disputed, will probably hold good upon examination; though in this instance I am inclined to consider it due more to the transmission of the conformation of the hock than to inherited weakness of either ligament, tendon, or sheath.

This brings me to the all-important question of conformation, the heredity of which in its application to unsoundness to my mind does not receive the attention its deserves. Here we have on the one hand certain diseases, upon the existence of which veterinary examiners are advised, and rightly too, to reject their possessor; on the other hand, certain conformations, in themselves far more serious than some unsoundnesses proper, and with even a stronger hereditary tendency, and upon which we have not the slightest hold whatever. And why, forsooth? Simply because their possessor is technically sound.

Gentlemen, the more I consider this matter the more do I become convinced that the word "sound," in its usual application to horses, is a pitfall and a snare. It draws a hard-and-fast line, and allows little or no room for individual opinion, and frequently lands a purchaser with a totally undesirable animal, because the said individual, having a perfect and blind confidence in the significance of the word, has committed himself to buy, conditionally upon the animal "passing sound." If possible I would obliterate the word "sound" from our veterinary vocabulary. I doubt not but that most present can recall instances in which, in the interest of a client, they have heartily wished the obnoxious word "to Jericho."

But this by the way. To return to conformation, "feet and hocks" are the points which chiefly lay themselves open to attack in this connection. Take the case of a horse with big flat feet, and the usually accompanying low and weak heels. With such feet, as a rule, a long journey on a hard road, or a sharp attack of purging, is all that is necessary to produce acute Laminitis. In this regard, then, *i.e*, the shape of the feet, particularly after they have undergone the changes incident to the disease, do I consider Laminitis hereditary. Then, again, is the vexed question of conformation of hock. Take, for instance, the so-called "sickle-shaped" hocks, the transmissibility of which cannot be denied, although there are notable exceptions. I ask you, Is it not the rule that, given a fair amount of work, Curb is the almost inevitable result? What I hold, and that most strongly, is that we should have the power equally of rejecting animals for such conformations as for some of the diseases already mentioned.

Contracted feet and curby hocks are both, I believe, inheritable malformations, but neither *per se*, and with no lameness present, seems of sufficient importance to warrant an animal's rejection. An affection upon which I have as yet seen no comment as to heredity, is Corns. If we admit brittle feet, I think (though not that the two necessarily go together), we must also admit Corns. I would here mention that fearing undue length, I have

purposely omitted any consideration of either hereditary vices or congenital malformations.

He (Mr. BLOYE) concluded by moving the following resolution, which was seconded by Mr. J. H. PENHALE, and carried :—

"That in the opinion of the Society every horse kept for stud purposes should be licensed, and that no licenses be granted to such an animal until he has been examined by a competent Board of veterinary surgeons, who shall certify as to the animal's soundness, and if hereditary disease exists, this shall be mentioned on the license, so that breeders may know the kind of animal they are using."

Mr. PARSONS, as did all the subsequent speakers, eulogised the paper which had just been read, and considered it well worthy of the author and the Association. He quite agreed with what the paper said on conformation; there could be no doubt as to shape and size being hereditary. But he did not at all hold that Splints and Spavins are always due to a bony diathesis. He did not think that these two diseases should come under the same category, as they often arose from distinct causes.

Mr. HEATH thought the conformation of our breeding stock might be safely left to the judges of our shows and exhibitions. He agreed that immorality and criminality leading to blindness and lunacy were hereditary. He would not, unless under special circumstances, disqualify for Splints. He believed, as did most of the other members of the Association, that Mallenders and Sallenders were forms of Grease. The time was coming, he said, when farmers, before using a stallion, would inquire for the veterinary certificate.

Mr. CHASE said it was our duty to point out to breeders the danger and loss which arose from breeding from unsound mares, especially those which had straight or sickle-shaped hocks. It was a great error to suppose that an old, unsound, worn-out, and ill-shaped mare could produce other than degenerate offspring.

Mr. BURTON did not agree that Splints were entirely hereditary, for he believed they also arose from concussion on macadamised roads and from shoeing.

Mr. W. PENHALE, junior, thanked Mr. Bloye for his very excellent paper. He said if we wished for good horses it was of the greatest consequence to breed from sound mares. He believed that vice and immorality were due far more to bad training and association than to heredity.

Mr. BLOYE said, in conclusion, that while admitting the influence of the mare, we must not forget the fact that from the mare there is only one offspring a year, whereas the sire may be the progenitor of large numbers. Therefore it is of far greater consequence that the stallion should be sound. He still thought that both Splint and Spavin were due to a bony diathesis, but he would not disqualify an animal for breeding purposes because he suffered from Splint.

The SECRETARY thought that nothing but sound horses should be allowed to be used, but, as at present, they were few, it was desirable not to press too far. In a few years, with careful breeding, there would be a better state of things. He was also of the opinion that the Government should subsidise none but sound horses, and that the recent outcry against veterinary examination was mainly due to the disappointment felt by exhibitors having their horses cast, and so losing the premium.

A unanimous and hearty vote of thanks was given to Mr. Bloye for his paper, with a request that it might be printed.

It was resolved to hold the next meeting at Exeter in October. The President then entertained those present to a *recherché* dinner.

WILLIAM PENHALE, *Hon. Sec.*

ONTARIO VETERINARY COLLEGE.

DURING the last three weeks of March the examinations of this College were in progress. The written tests always take place first, and on the 25th of this month the Board of Examiners met to hold the final orals, and to award the diploma of the Agricultural and Arts Association to the successful students. Several days were occupied in this work, as each student must go before six examiners in regular rotation.

On the 29th, all the examinations having been completed, a large meeting of students and friends of the College was held in Richmond Hall, at which the medals and other prizes were presented, and the names of the successful graduates announced. Professor Smith, F.R.C.V.S., Principal of the College, occupied the chair, and on the platform were, among others, Sir Daniel Wilson, President of University College; Hon. Charles Drury, Minister of Agriculture, Dr. Thorburn, Dr. Duncan, Dr. Peters, Dr. Caven, J. J. Witherow, Esq., President of the Industrial Exhibition Association; Major Lloyd, J. H. Wilson, V.S., C. Sweetapple, V.S., Mr. Cowan, V.S., W. Shaw, V.S., Ald. Frankland, Ald. Dodds.

Professor SMITH, in opening the proceedings, spoke of the success of the past session. He briefly referred to the fact of so many students attending from all parts of the Continent, stating that one of the graduates that day was from Honolulu, Sandwich Islands. After addressing words of encouragement and good cheer to all present, he concluded by requesting the President of University College to address the audience.

Sir DANIEL WILSON was received with applause. He paid a graceful tribute to the President of the College, Professor Smith, and referred in terms of high praise to the work this veterinary college has done. His most hearty wishes were for its continued prosperity, as he considers it to be one of the most valuable educational institutions of the country.

The names of the graduating class, with the honour and prize list, were then read, after which the prizes were handed to the successful students, and congratulatory speeches made by Hon. C. Drury, G. B. Smith, M.P.P., J. J. Witherow, Esq., Ald. Frankland, Ald. Dodds, Major Lloyd, and others.

Alderman DODDS, in the course of his remarks, stated that in his journeyings through the United States he found that the possession of the diploma of the College was a passport to the confidence of the prominent stock-breeders in all parts of that country.

There were 125 graduates, many of whom were prizemen. At the conclusion of the proceedings a pleasant feature was the presentation of a large picture of the graduates in group form to Professor Smith. The picture, which is about six feet square, with gilt bronze frame, contained the likenesses of 170 graduates. Mr. Monsarratt, of Honolulu, Sandwich Islands, made the presentation. The new college building will be proceeded with at once; it will probably be in readiness for the next session's work.

MONTREAL VETERINARY COLLEGE.

THE twenty-second session of this College was concluded on March 27th, by the final examination of the students by a Board of Examiners appointed by the Council of Agriculture. The Board was composed of Messrs. J. W. Gadsden, M.R.C.V.S., Philadelphia; Williamson Briden, V.S., Boston, Mass.; Archibald McCormick, V.S., Ormstown; J. A. Couture, V.S., Quebec; A. W. Harris, Ottawa, and Dr. James Bell, Montreal. The following students passed successfully the examinations prescribed by the curriculum of the College in the following subjects; viz., botany, histology, chemistry, physiology, materia medica, anatomy, cattle pathology, and practice and theory of veterinary medicine and surgery, and were considered by the Board fully

qualified to practise the art and science of veterinary medicine and surgery; viz., Messrs. R. D. Austin, R. Darling, G. P. Dillon, J. G. Goddard, J. G. Harris, J. McCurdy, H. McWhennie, R. C. Mylne, J. M. Parker, Wm. M. Simpson, T. W. Skaife, and E. I. Willand.

The closing exercises took place in the College lecture-hall in the afternoon, the hall being crowded with students and friends of the institution. Col. Rhodes, Minister of Agriculture, occupied the chair, and on his right sat Sir Wm. Dawson, Chancellor of McGill University. Among those present were Messrs. S. M. Blackwood, member of Council of Agriculture; J. W. Gadsden, Provincial Board of Agriculture; Williamson Bryden, of Boston, Mass.; Prof. Wesley Mills, Prof. Penhallow, Dr. McEachren, Dr. Baker, J. X. Perrault, and a number of others interested in the work of the College. At four o'clock Col. Rhodes took the chair, and proceeded, amid continued applause, to award the prizes to the successful competitors. The following is a list of the prizes awarded :—

Silver medal, the gift of the Council of Agriculture, for the highest number of marks in all the subjects for the three years. Won by Mr. Robert Darling.

Practice of Medicine and Surgery.

1st prize, J. G. Harris; 2nd prize, E. A. Wieland.

Cattle Pathology.

1st prize, E. A. Wieland; 2nd prize, H. McWhinnie.

Anatomy.

1st prize, Wm. M. Simpson; 2nd prize, H. McWhinnie.

Special prize given by Prof. Wesley Mills, for his efforts in connection with the study of comparative psychology, to J. M. Parker.

Prize awarded by Prof. J. A. Couture, for best oral examination in the practice of medicine and anatomy, won by Henry McWhinnie.

Juniors.

Physiology—1st, R. N. Walsh; 2nd, J. F. Scott.

Chemistry—1st, J. F. Scott; 2nd, M. Hayman.

Materia Medica—1st, A. M. York and J. F. Scott, equal; 2nd, R. N. Walsh.

Anatomy—1st, A. M. York.

The prizes having been awarded, Sir Wm. Dawson was called on, and at the commencement of his address referred very touchingly to the death of Dr. R. P. Howard, Dean of the Medical Faculty of McGill. He spoke of the deceased as a man of excellent qualities, and felt deeply grieved at his death. The veteran Chancellor of McGill paid a high compliment to the Montreal Veterinary College, and said it was a valued and important institution, and deserved all credit in the work, which is of a highly practical kind. He was glad that McGill was able to do something towards carrying on this important work. He believed that McGill would welcome closer connection with the Veterinary College, recognising the growing importance of veterinary science. Personally he was much in sympathy with the school, whose studies occupied a very high place in practical science.

Col. RHODES, Minister of Agriculture for the Province of Quebec, addressed the assemblage, and in the course of his remarks said that the education of men in agricultural pursuits is a very important study. He said he owed the position he now holds to his knowledge of all the details of agriculture. He stated that the Provincial Government wants to improve the position of the veterinary profession, and expressed a desire to have the Veterinary College more closely allied with the Agricultural Department of the Government, which is a most natural position for it to hold, and the outcome would be very beneficial. He offered to the College the services of the provincial lecturers on agricultural branches, should their services at any time

be needed by the College. The gallant Colonel promised to give his hearty support to the institution, both in his official capacity and as a private citizen.

Mr. S. M. BLACKWOOD, a member of the Council of Agriculture and one of the examiners, spoke highly of the graduating class. He commented on the fact that too many of our veterinary surgeons went abroad when their services were much required at home. He said some effort should be made to keep the graduates at home.

Mr. J. W. GADSDEN congratulated the men on the profession they had chosen and on the school they had selected wherein to pursue their studies. As one of the examiners, he spoke very highly of the manner in which the graduating class had acquitted themselves in their examinations. He denounced the manner in which some so-called American colleges granted diplomas to men who had been able only to get a mere smattering of the knowledge required by a Veterinary surgeon, and characterised it as very unfair, and thought some change should be effected so as to guard the public and the profession as wel'.

Mr. WILLIAMSON BRYDEN eulogised the Montreal Veterinary College as having attained an eminent position among colleges of its kind in the country.

Mr. J. X. PERRAULT was called on, and gave an excellent and practical address. He forcibly pointed out the claims of the College on the Government and on the people.

Mr. F. W. SKAIFE, one of the graduates, gave the valedictory address, which was a good one, the subject being treated as viewed by the men who are about to go forth to enter upon the duties of their profession. The address treated the veterinary question on a commercial basis, and dwelt on some advantages in that line. It also treated of the veterinary profession in its relation to, and standing among, the sciences. The study of human and animal life could not easily be separated, and as the study of the latter becomes more advanced the relation of the two becomes more apparent. The address also treated of the profession in its relation to society. The valedictorian was greeted with hearty applause from the students' benches, as well as from the platform.

Dr. MCEACHRAN made a few remarks, and referred feelingly to the death of Dr. R. P. Howard, who for years past was a regular attendant at the Convocation exercises, and whose absence was much felt. He said the Veterinary College was much indebted to McGill University and the Provincial Government for aid in carrying on the work, and without which they would be sadly off. He said it would be a great honour for the College to be taken under the wing of McGill and made a faculty of that University.

Professors WESLEY MILLS and PENHALLOW were called for, and both responded by making a few remarks. Professor Mills spoke very highly of a paper on Comparative Psychology by Mr. J. M. Parker, for which he received a prize, and expressed a desire to see the paper published.

At the close of the Convocation exercises the Montreal Veterinary Association and the Society for the study of Comparative Psychology met, and each Society granted its diplomas to the graduates.

PATHOLOGICAL SOCIETY.

AT a meeting of this Society on April 2nd, Mr. W. G. SPENCER showed a large series of bones which had been obtained at the Brown Institution, and read a paper on them. He commenced by giving an account of the clinical symptoms which had been given to him by Mr. Thomas Busbie, the resident officer of the Brown Institution. The animals were first noticed to waste, and to have difficulty in feeding; symmetrical swellings formed on the lower jaw, between the angles and the teeth, and frequently also swellings at the

ends of the long bones. In the later stages the bones became still more thickened, the ingestion of food became impossible, and the animals died of starvation. The disease was most frequently found in goats that were kept for milking purposes in London, where they were fed upon corn or cooked vegetables or garbage, instead of coarse grass and hay, their natural food. The pathological conditions could be divided into three stages: (1) Early stage, where the bones of the jaws were soft, and in which there was a pale pinkish growth which took the place of bone, and formed swellings which, in the lower jaw, might become two inches thick. On microscopical examination this growth was found to consist of large, oval, multinucleated cells, scattered amongst the trabeculæ of the bone. The trabeculæ gradually disappeared, and left the large cells scattered about and enclosed within a very thin shell of bone. There were no signs of connective tissue formation, nor were there any hæmorrhages. The growth was entirely confined within the periosteum, which was stretched over it. The bones of the upper jaws were similarly affected to those of the lower jaw. The flat bones of the skull were softened and affected by similar growth. (2) In the long bones the ends of the diaphyses were affected by similar growths to those in the jaws. The shafts retained their hardness, and showed no tendency to spontaneous fracture in the early stages, but in advanced cases the long bones could be cut by a knife, and after maceration had a light, spongy, worm-eaten appearance. (3) The joints contained some blood-stained fluid, and the synovial membranes were of a gelatinous character. The articular cartilages were of a slaty-blue colour and partially eroded. These changes came on early in the disease, and might pass off before death occurred. Mr. Spencer showed for comparison the skull of a horse from the museum of the Royal Veterinary College which was similarly affected. The skull was very light, and the bones, especially those of the upper and lower jaws, were enlarged, spongy, and worm-eaten. The disease in horses had been described by Dr. George Harley in the Path. Soc. Trans., vol. xi. The clinical characters were very similar to those of the disease in goats. He showed for comparison the bones of a goat which had suffered from osteomalacia, and gave a description of the symptoms and pathological changes in this disease. He considered that the disease which he had described was not rickets, as the course was different, and the epiphysial cartilages in the young animals were normal. The disease had no relation to actinomycosis, and no micro-organisms had been discovered. Although little light could yet be thrown upon the causation of this disease, yet if it formed a link in any way between the various general diseases of bone above alluded to, it might elucidate the causes of these diseases, which were at present involved in obscurity.

The PRESIDENT remarked on the various causes that were antecedent to the disease, and especially that it was not entirely due to civilisation.

Mr. BLAND SUTTON did not consider the disease to be the same in goats and horses; he thought the disease in goats was essentially a form of rickets, which picked out in these animals the membrane bones rather than those which were preformed in cartilage. He referred to a series of cases of this disease in goats that he had published in the Odontological Society's Transactions. It had been shown that the late eruption of the teeth in rickets was owing to the large size and crowded condition of the tooth follicles. In ruminants the tooth follicles were unusually large, and he thought that the condition described by Mr. Spencer in the jaws might be considered as fibrous odontomes. Six weeks ago he (Mr. Sutton) had described an odontome due to rickets, from a human subject, which he had found in the museum of the Royal College of Surgeons. The disease in goats was not invariably fatal, as a Himalayan goat, which used to be in the Zoological Gardens, had lived for twelve years, and when it died two large tumours in

each upper jaw were found which had suppurated, and were found to contain 200 small denticles, the soft contents having decayed away.

Mr. STEPHEN PAGET thought the disease under discussion was entirely different from rickets, and asked Mr. Spencer if he had seen any goats which suffered from the type of rickets which was commonly found in children. He asked Mr. Sutton: 1. Why he separated the disease of goats from that of horses. 2. Whether he could account for the disease in goats being more prevalent at one time of the year than another.

Mr. BLAND SUTTON replied that rickets manifested itself differently in different animals; that in bears and lions the ordinary epiphysial changes and the masses in the jaws were found together.

Mr. SPENCER, in reply, said that the manifestations of the disease which he had described were certainly different from those which were known as rickets in human pathology; whether the causation was the same or not he was not prepared to say. The disease was both clinically and pathologically the same in goats and horses, and the disease was invariably fatal in goats.

ROYAL AGRICULTURAL SOCIETY.

AT the Monthly Meeting, held on March 27th, Sir JOHN THOROLD announced that Professor Brown had presented the following report:—

"*Pleuro-pneumonia.*—The recently published returns show a decrease in the number of outbreaks of this disease. During the three weeks ended March 16th there were twenty-two outbreaks reported: fourteen of these were in England, in the counties of Cumberland, Kent, Lancaster, Middlesex, Norfolk, Oxford, Surrey, York (West Riding), and the Metropolis; the remaining eight outbreaks occurred in Scotland—six were in Edinburgh, one in Fife, and one in Perthshire. The number of cattle attacked in Great Britain were ninety-seven, of which seventy were in England, and twenty-seven in Scotland. In addition to the above, 428 healthy cattle which had been exposed to infection were slaughtered.

"*Anthrax.*—There have been only five outbreaks of this disease reported in the three weeks; seventeen cattle were attacked.

"*Swine Fever.*—The decrease in the number of outbreaks of this disease continues: 195 outbreaks were reported in three weeks, an average of 65 per week, whereas the outbreaks in the preceding nine weeks were over 70 per week. The number of swine attacked amounted to 1,174: of the diseased swine 575 were killed, 540 died, 126 recovered, and 352 remained alive when the last published return was made up.

"*Foot-and-mouth Disease.*—Owing to the discovery of Foot-and-mouth Disease among German sheep landed at Hartlepool and Deptford, an Order of Council was passed on Saturday, to come in force at once, prohibiting the landing in this country of animals from Germany.

"Since the Order was passed the disease has been discovered among German sheep at Grimsby and Hull."

The conference on the subject of cross-Channel traffic in cattle between representatives of the three national agricultural societies, had been arranged for Thursday, the 28th instant, at 10.30 a.m. The Order of the Privy Council as to the admission of cattle from the Netherlands without subjection to quarantine was laid upon the table. A letter had been read from the Royal College of Veterinary Surgeons, forwarding a copy of the following new bye-law, which had been adopted at a special meeting of the Governors of the College held on the 21st inst.:—

"Subject to the prescribed approval and election, members of the Royal Agricultural Society of England who contribute (to the College), one guinea per annum shall, during the continuance of their subscription, be deemed subscribers to the College, and be entitled to the privileges of subscribers."

The Committee recommended that the thanks of the Society be given to the Royal Veterinary College for their courtesy and liberality in this matter. Professor Brown had presented the quarterly report of the Royal Veterinary College, which was ordered to be printed with the proceedings of Council.

The report is as follows :—

Quarterly Report of the Royal Veterinary College, by Professor Brown, C.B., Principal of the College.

An outbreak of Tuberculosis among cattle and swine was investigated in the beginning of the year. The disease was first noticed in September, 1885. It re-appeared in the summer of 1888, and a valuable heifer showed signs of the affection after calving twin calves. The heifer died a few months afterwards, and both of the calves subsequently became affected and were killed. Another heifer showed symptoms of the malady soon after calving, and was killed. In this case the disease was in a very advanced stage. The calf also was found to be affected when killed at five months old. A number of pigs were fed on the milk (skim) from the cows, and about twelve of them suffered from what was believed to be tubercle.

Two cows and two pigs were sent to the College for observation. Both of the cows presented the wasted appearance and other signs of tuberculous disease--the tubercle bacilli could be detected in the milk, and rabbits fed on it did not suffer in consequence. The pigs were in poor condition, but fed well and gradually improved. All the animals were carefully examined *post mortem* in the middle and end of February. One cow died, the other was killed, and also the two pigs.

In the first cow a mass of tuberculous deposit was found in one lung, but no trace of tubercle was detected in any other part, and the fœtus which was found in the uterus was perfectly free from tuberculous deposit. A large tumour was found in the liver of the cow, and this was the immediate cause of the animal's death.

In the second cow no tuberculous deposit was found in any part of the body. The disease from which the animal suffered was Distonitis, due to a large nail about 4 in. long, which had been at some time swallowed and had passed through the walls of two compartments of the stomach, and set up inflammatory action, resulting in the formation of an abscess. The case was extremely interesting, affording, as it did, clear evidence of the fact that some of the most characteristic signs of tubercle may exist as a result of chronic disease of important organs, without any trace of tubercle being present. In reference to the pigs, it may be stated that no sign of tubercle was observed in any of the organs.

The *post-mortem* examinations and microscopical investigations were conducted by the Demonstrator of Bacteriology at King's College.

In the beginning of February an outbreak of disease among sheep in Hertfordshire was the next subject of inquiry. The flock consisted of 150 mixed bred fattening sheep, bought in September last. Previous to this no sheep had been kept on the farm for several years. Early in January the whole flock, on the appearance of Scab, were dipped in an arsenical dip. This process not proving effectual in a week, many of them were "salved" with mercurial ointment. Soon after the latter application a considerable number showed signs of illness, and several died. At the time of the inquests there were about twenty affected, and two dead.

The most remarkable symptoms were great depression, salivation, grunting, short, jerky, and apparently difficult breathing. On the skin there was a large quantity of ointment of a blue colour resembling common mercury ointment.

Examination of the carcases revealed also a large amount of blue ointment on the skins. The skin, however, gave little evidence of disturbance. Some of the viscera had undergone marked degenerative change, notably the kidneys and liver. There was congestion of the mucous membrane of the mouth, and true stomach. Three carcases sent to the College revealed similar changes, and on the tissues of one chemically analysed, traces of mercury were found. The ointment found on the skin was largely composed of mercury.

The foregoing facts proved that the illnesses depended on the mercurial application, and discontinuance of the ointment was therefore advised, and the removal from the skin, where practicable, of what was to be found on it. These measures were successful in checking the progress of the disease.

A disease appeared among swine in Sussex attended with considerable mortality, and it was at first believed that Swine Fever had broken out. The progress of the affection was not sufficiently rapid to support this conclusion. Some morbid parts from pigs dead of the disease were sent to the College, and it was ascertained that the characteristic lesions of Swine Fever were absent. The veterinary surgeon in attendance finally came to the conclusion that the animals had suffered from exposure to cold.

Cases of premature birth in a flock of ewes in Sussex following in the death of a large proportion of the ewes came under observation. It was alleged that the alarm caused by the incursion of a foxhound puppy was the direct cause of the fatality. But Professor Axe, who investigated the matter, ascertained that the incident had happened several weeks before any case of illness occurred in the flock; and further it appeared that flocks in farms in the same district had suffered in like manner. From the evidence it was suspected that the cases of premature birth were due to some deleterious elements in the food, and the discovery that the sheep had been supplied for some time past with mouldy hay, lent some support to this presumption. It was advised that this mouldy hay should not be given to the sheep, and since its disuse no further cases have occurred.

A severe form of catarrhal disease among sheep in Surrey was recently investigated, and from the symptoms exhibited by the diseased sheep, it was concluded that they had suffered from the presence of "bots" in the sinuses of the head. The irritation was probably caused by the migration of the parasites from their position in the nostrils. This case is still under observation.

There are at present in the College Infirmary cases of the following diseases of cattle and sheep:—

Husk in calves and lambs.	Actinomycosis in cattle.
Abortion in ewes.	Hydatid in brain of sheep.

Experiments are being conducted to test the action of certain organisms found in Swine Fever; also to further test the communicability of human Tuberculosis to cattle and other animals.

Inoculation of calves with the virus of Black-leg with the view to ascertain the most simple and efficacious method of protecting them from the natural disease is being carried on. During the quarter a variety of morbid specimens have been received at the College, and used for illustrating the lectures in the several diseases of cattle, sheep, and swine, and eleven animals have been received into the College alive and have died or been slaughtered for *post-mortem* examination.

Mr. JACOB WILSON, before the report was adopted, asked permission to say one or two words. When the Veterinary Report was presented a month ago, he ventured to sound a note of alarm at the action of Her Majesty's

Government in having removed the prohibition against the importation of Dutch cattle. He was perfectly aware that the resolution had not been come to without very serious consideration, and practically with every justification for the action taken, and he was also aware that it was strictly in accordance with the Act of Parliament which regulated the matter. Since, however, that had taken place, they had to listen to a much more serious item of information which had just been read by the Chairman of the Veterinary Committee. In spite of the great care taken by the authorities of this country, Foot-and-mouth Disease, from which the country had been freed, had once more been imported from Germany. He confessed that he regarded this with some degree of dread, and more particularly in view of the recent removal of the prohibition against Holland; because, whilst they might be perfectly safe with regard to Dutch cattle *per se*, they were not quite certain as to the restrictions which existed between Holland and Germany. (Hear, hear.) He had no desire whatever to create a panic in the agricultural world, by anything he might say; but on the contrary to remove apprehension by more specific information. He was glad to see Professor Brown present that morning, and he should like to ask him the two following questions:—1. What restrictions are, or have been, recently in existence with regard to the introduction of animals from Germany into Holland? 2. Whether in consequence of the recent outbreak of Foot-and-mouth Disease in Hamburg, any additional restrictions have been imposed by the Dutch authorities?

Professor BROWN, in reply, said that the two questions asked by Mr. Wilson could be answered in extremely few words. In regard to the first, he (Prof. Brown) might tell the Council that Holland had for years past prohibited the entrance of German cattle on account of Cattle Plague, and for the further reason that England had prohibited German cattle since the outbreak of Cattle Plague in 1877. But Holland had allowed the transit of German sheep for a considerable period, and so long as they permitted the landing of animals from Holland for slaughter, there was no reason why it should be discontinued. But when Holland became free from disease the Dutch Government made an effort to get their cattle and sheep imported without being subject to slaughter or quarantine. In order to do this they were compelled to prohibit from all countries in which disease existed. Under these circumstances the Privy Council had no option in the matter. The outbreak of Foot-and-mouth Disease had occurred in Hamburg, and diseased sheep had been sent from that port and from Bremen. Holland was in the position that she had already prohibited from Germany in common with other countries. They had had no communication with the Netherlands Government since this outbreak occurred, but he thought he might say without hesitation that no more restrictions could have been imposed upon the importation of foreign animals by the Dutch Government than were already in force. The prohibition was total, as it had been before this outbreak of Foot-and-mouth Disease in Germany occurred.

Colonel KINGSCOTE said he looked upon this as one of the most serious things that had taken place for some time, and he hoped that it would be stopped at once. If not, it would be a terrible thing for agriculturists. He suggested that a resolution should be adopted and forwarded to the Privy Council.

Lord EGERTON of TATTON said that restrictions were imposed upon animals coming from Germany to Holland; but as Foot-and-mouth Disease might be communicated by those who had attended the animals there was that danger in England, and the same thing might happen with respect to the importation of cattle from Germany into Holland.

Mr. STRATTON said no action could be too strong on the part of the Society,

and he thought they would be strengthening the hands of the Government in passing a resolution on the subject.

Mr. ALLENDER said that Holland was as much interested as any other country in keeping out the disease. They had very valuable cows and herds, and therefore took good care of themselves. There was no country more particular. He had himself found it impossible to send cows to Germany *via* Holland.

The Duke of RICHMOND and GORDON stated that he was present at the meeting of the Committee of Council on Agriculture, which passed the Order allowing animals to come from Holland, and that with the Act of Parliament before them, and with the evidence produced to them by the Dutch Government, it was perfectly impossible to come to any other conclusion. The clause was imperative; it said that when the Dutch Government should show that they had taken and are taking such precautions against the admission of disease into that country, and that there was a total absence of any disease in that country, then they must be allowed to send the cattle here. There was no question about it. But he thought possibly it might meet the views of Colonel Kingscote and others if a letter were written, signed by his Royal Highness the Acting President calling the attention of the Privy Council to the fact that an outbreak of Foot-and-mouth Disease had occurred in Germany, and that sheep affected with that disease had been landed in this country; and requesting the Privy Council to consider whether in these circumstances they were still of opinion that the precautions taken in Holland were sufficient for the purpose. (Hear, hear.) He thought that was the utmost they could do. He did not think it would be wise to recommend the Privy Council to withdraw that which they had had to pass the other day very reluctantly.

Mr. WAKEFIELD having asked what steps had been taken by the local authorities at ports in the kingdom to prevent the importation of the disease,

Professor BROWN replied that the matter was entirely in the hands of the Privy Council, and assured the Council that everything possible had been done. The sheep had all been slaughtered with the greatest rapidity since Saturday last; and every possible precaution had been adopted to secure the complete disinfection of the persons employed in slaughtering the animals affected by the disease.

The Duke of RICHMOND added that in justice to the Agricultural Department, it should be mentioned that although the intelligence of the outbreak of Foot-and-mouth Disease only reached the country about midday on Saturday last, the Order was passed by the Privy Council by 4 o'clock the same day.

It was then agreed that a letter in the sense suggested by the Duke of Richmond should be addressed to the Lord President of the Council in the name of the Society, and his Royal Highness the Chairman consented to sign such letter as soon as prepared.

Army Veterinary Department.

Gazette, April 16th.

Veterinary Surgeon Thomas Caldecott resigns his commission, dated 17th April.

Veterinary Surgeons Ewing, Walker, Ringe, and Burke have arrived in England from India after a tour of foreign service. Veterinary Surgeon Appleton has arrived from India on sick leave. Veterinary Surgeon Murray

Anderson has embarked for a tour of service in Egypt, to take the place of V.S. Griffith, who is seconded for service with the Egyptian Army, *vice* V.S. Beech, who has received a lieutenant's commission in the 21st Hussars.

Obituary.

THE death is reported of J. B. Jones, Ludlow, Salop, who graduated in 1837.

The veterinary profession in Italy has sustained a heavy loss by the death of Professor Vallada, who was Director of the Veterinary School at Naples, and previously of that at Turin.

Notes and News.

BIRD SURGERY.—Some most interesting observations made by M. Fatio on the surgical treatment of wounds by birds, were recently brought before the Physiological Society of Geneva by Dr. Snipe, a surgeon, whose name is a curious coincidence. It was stated that the snipe had often been observed in repairing damages. With its beak and feathers it makes a very creditable dressing, and even has been known to secure a broken limb by means of a stout ligature. On one occasion M. Fatio killed a snipe which had on the chest a large dressing, composed of down from other parts of the body, and securely fixed to the body by coagulated blood. Twice he had had snipe with interwoven feathers strapped on to the site of a fracture of one or other limb. The most interesting example was that of a snipe both of whose legs he had unfortunately broken by a misdirected shot. He only recovered it on the following day, when he found that the poor creature had contrived to apply dressings and a sort of splint to both limbs. In carrying out this operation, some feathers had become entangled around the beak, and not being able to use its claws to get rid of them, it was almost dead from hunger when found. In a case recorded by M. Magnin, a snipe which was observed to fly away with a broken leg was subsequently found to have forced the fragments into a parallel position (the upper fragment reaching to the leg joint), and they were secured there by means of a strong band of feather and moss intermingled. The observers were particularly struck by the application of a ligature of a kind of flat-leaved grass, wound round the limb in a spiral form, and fixed by means of a glue-like substance.

LONGEVITY OF MICROBES IN WATER.—In a note recently published by Drs. Straus and Dubarry, on researches into the duration of life of pathogenic microbes, the authors obtained the following results:—A great number of pathogenic microbes possess the faculty of living in water for a period more or less long. They therefore do not differ much in this respect from aquatic bacteria. The chemical composition of the water is not of much importance, as these pathogenic microbes live as long in distilled water as in water charged with organic or inorganic matters. These microbes do not appear to lose much of their virulent properties in a medium but little charged with nutritive principles, excepting, perhaps, the bacillus of Tuberculosis. The following are given as examples:—The bacillus of Charbon was found living in water after 131 days, where it formed spores; that of Typhoid Fever after eighty-one days; that of Asiatic Cholera after thirty-nine days. Even this duration of life is probably not the maximum.

A HORSE WEARING SPECTACLES.—Strange stories are sent us for acceptance by our friends across the sea. The *American Druggist* tells of a horse

that wears spectacles. The farmer who owned him having come to the conclusion, from various symptoms, that the animal was short-sighted, got an oculist to take the necessary measurements, and had a pair of spectacles manufactured for him. They are made to fasten firmly into the headstall, so that they do not shake out of place. At first, the horse appeared startled by this addition to his harness, but he soon got used to his glasses, and liked them. "In fact," says his owner, "when I turn him out to pasture he feels uneasy and uncomfortable without his goggles, and last Sunday he hung round the barn and whinnied so plaintively that I put the headstall and goggles on him, and he was so glad that he rubbed my shoulders with his nose. Then he kicked up his heels, and danced down to the pasture. He could see what he was going to eat then."

ACID SUBLIMATE AS AN ANTISEPTIC.—Dr. Laplace has discovered that the addition of an acid to the solution of corrosive sublimate increases its power as an antiseptic to such an extent that it may be used thus in much weaker solution than has hitherto been the case. The author has made a considerable series of experiments in which the bichloride of mercury solution was used as an antiseptic for surgical dressings, such as gauze, cotton wool, linen bandages, etc. Now it appears that in such cases albuminate of mercury is often formed, which is insoluble, and the antiseptic dressing ceases to act. To avoid this Dr. Laplace adds an acid, and gives the preference to tartaric acid; he assures us that this causes no irritation to the wound. The solution in which the gauze, cotton, or linen is steeped is composed as follows:—Corrosive sublimate one gramme, tartaric acid five grammes, distilled water one thousand grammes. The author has proposed even a stronger solution than this for steeping the dressings, but in view of the numerous accidents which have occurred in using bichloride of mercury as an antiseptic it is necessary that this extremely poisonous salt should be used with the greatest care.

BERLIN VETERINARY UNIVERSITY.—Professor Dr. Schütz, of this University, has been appointed Rector for three years—from 1889 to 1892.

"LOCO-POISONING."—The ranchmen of Kansas and Texas have suffered serious loss, owing to the prevalence of a peculiar train of symptoms, commonly ending in death, which have been for some years observed to affect cattle and horses in certain districts. The animal affected loses flesh, has a feeble, staggering, uncertain gait, a rough coat, and general appearance which is said to be characteristic; it loses all sense of distance or direction, and is liable to fits of rearing, plunging, and wild excitement; pregnant animals drop their offspring prematurely. It is known as the Loco, or crazy disease, and is believed to be caused by eating a plant which is generally identified as the astragalus mollissimus, and is commonly known as the loco-weed. The liking for the plant is an acquired taste, but, once formed, only strict confinement in a pasture free from the weed can eradicate it. In one county of Kansas alone five hundred horses and cattle have died in this way, but Dr. H. C. Wood, of Philadelphia, and Mr. Kennedy, of Texas, both failed, by experimenting on animals, to prove that the plant was poisonous; the latter, however, quoted a Mexican belief that it was poisonous to human beings, producing a condition resembling insanity, and ending in death. The Mexican señoras, it was said, sometimes get rid of an inconvenient husband by administering draughts of the fatal decoction. In spite of the failure of the experimenters, the belief in the poisonous qualities of the loco-weed gained ground, and now Dr. Mary Gage Day has published some fresh experiments, which gave very definite results. She used a decoction of roots, leaves, and stems, gathered in September, and gave rather large quantities to cats and kittens with their food; all the animals became affected, the kittens sooner than the cats, with

symptoms closely corresponding with those observed in "locoed" horses and cattle. The "jack-rabbit" of Texas, it was found, quickly acquired a liking for the plant, suffered from the same symptoms, and died in ten days. Dr. Day makes an observation which may explain the failures of other experimenters; she is convinced, from experiments made with materials gathered in different months, that the greatest amount of poison is present in the autumn and winter, after the seeds have ripened; it is at these seasons also that the disease is most rife.

A SUPPOSED BACILLUS OF CANCER.—Professor Platon I. Kubasoff, of Moscow, has carried out a long series of bacteriological researches on malignant (cancerous) new growths, and has arrived at the following conclusions:—1. The disease is caused by a special pathogenic rod-shaped microbe. 2. The bacilli have slightly ovoid outlines, and are arranged mostly in pairs and little heaps, their length amounting to one-fourth of the diameter of a red blood corpuscle. 3. In a pure cultivation the rods grow best on coagulated blood-serum at the body temperature. 4. When inoculated under the skin in animals, the microbe gives rise to a cancerous degeneration, commencing in the nearest lymphatic glands, and subsequently spreading to the internal organs, especially to the mesenteric glands, omentum, liver, and pericardium. In all the organs genuine cancerous nodules are formed. 5. Of lower animals, rabbits and cats prove to be most sensitive in regard to the bacterium. When inoculated they die in one or two months from cachexy, with generalisation of cancerous foci all over the body. 6. All cancers (of any variety and any organs) seem to be caused by one and the same bacillus.

ROYAL ACADEMY.—Our readers will be gratified to learn that Veterinary Surgeon Adrian Jones, 2nd Life Guards, has been again successful in having one of his works of art admitted for exhibition this year. This is the fourth year in which he has been an exhibitor, and this time also it is a statuette. The subject is named the "Standard Bearer," and represents a trooper of the 2nd Life Guards in the act of pulling up his horse, and at the same time holding aloft the standard he carries, in order to rally his regiment after the charge at the Battle of Waterloo. He is in the uniform the Household Cavalry wore in those days, and the attitude of horse and man are most excellent—full of animation and *verve*. The horse is exceedingly well modelled, and so faultless and graceful is it portrayed that one cannot help regretting Mr. Jones was not employed to model the horse for the Duke of Wellington's statue at Hyde Park. It would have been a very different affair to the lifeless, wooden-like animal Mr. Boehm has straddled the Iron Duke across; and we fancy our colleague could also have furnished less comical-looking supports than the four soldiers which figure at each corner of the pedestal, and who appear to be suffering from acute Opisthotonos. Mr. Jones is to be heartily congratulated on his success as a modeller and an exhibitor.

DOGS IN HOSPITAL.—The story of the canine patient of King's College Hospital finds something of a pendant in the following, which is sent to the *Spectator* by Miss Helen M. Sturge: "A week or two ago, the porter of the Bristol Royal Infirmary was disturbed one morning, about half-past six, by the howling of a dog outside the building. Finding that it continued, he went out and tried to drive it away; but it returned and continued to howl so piteously, that he was obliged to go out to it again. This time he observed that one of its paws was injured. He therefore brought it in and sent for two nurses, who at once dressed the paw, and were rewarded by every canine sign of gratitude, including much licking of their hands. The patient was 'retained' for two days, during which time he received every attention from those inside the house, and from the neighbours outside, who quickly heard of the case. As no one appeared to claim the dog, he was sent to the

Home for Lost Dogs in the city, where so interesting an animal was, of course, not long in finding a purchaser. The dog was one of those called 'lurchers.'" Miss Sturge adds: "I have myself called on the porter of the infirmary for confirmation of the story, and am assured by him of its truth. How did an apparently friendless dog know where to go for surgical aid? The case differs from that of the dog which took its friend for treatment to King's College Hospital, in London, for I understand that the King's College dog had previously been taken to the hospital for treatment itself, but in this case there is no such clue."

THE DISHORNING OF CATTLE.—In the Queen's Bench Division, recently, the case of Ford *v.* Wiley was argued before the Lord Chief Justice and Mr. Justice Hawkins. Appellant, who is in the employ of the Society for the Prevention of Cruelty to Animals, appealed against a refusal of the Norfolk magistrates to convict the respondent, a farmer, under 12 and 13 Vict., chap. 92, for dishorning several oxen. The Court declared that they had most clearly and distinctly decided to give judgment reversing the decision of the Norfolk magistrates, and declaring the practice of dishorning to be unlawful. They would give their judgment and reasons in writing next term.

PASTEURISM IN TURKEY.—From a report recently issued by Dr. Zoeros, Medical Superintendent of the Pasteur Institute at Constantinople, it appears that between May 1st, 1887, and March 1st, 1889, forty-one patients were treated. Of these, twelve had been bitten by animals experimentally proved to have been rabid; twenty-six by animals in which the disease was recognised by medical men, veterinary surgeons, "or other competent persons"; and three by animals in which Rabies was suspected. Fourteen of the cases were treated by the simple, and eighteen by the intensive, method, while in nine the "mixed" procedure was adopted. No death has occurred, nor have there been signs of the development of Hydrophobia in any of the cases.

THE BACTERIOLOGY OF TETANUS.—Professor Bizzozero has just submitted to the Royal Medical Academy of Turin the results obtained by Professor Tizzoni of Bologna and Signora Giuseppina Cattani on the bacillus tetani. These investigators took their material from a patient in the surgical wards, the victim of a fracture the seat of which had been contaminated by soil from the ground on which he had fallen. Traumatic tetanus of the most characteristic kind had ensued. Experiments made with the living blood in great quantity, with the median nerve and medulla of the bone taken a little above the point of fracture immediately after amputation of the limb, and also with the brain and spleen after death, yielded negative results, both with the cultures and the experiments themselves. From the material taken from the osseous surfaces of the fracture and from the soft parts immediately contiguous, there were obtained other micro-organisms and the "bacillus spilliformis" of Nicolaier. These latter, inoculated in animals, produced tetanus, followed by death after twenty-four or forty hours. Left to themselves for three months in blood serum slightly solidified at a low temperature, there was again obtained from their inoculation distinct tetanus. Cultures of this liquid yielded a coccus, a short bacillus, and the bacillus of Nicolaier. Such colonies become so intimately fused with others that not seldom the transplantings from them turn out impure. This result probably accounts for the findings of Drs. Belfanti and Pescarolo. In any case Drs. Tizzoni and Cattani are the first, according to Professor Bizzozero, who have obtained a pure culture of the bacillus tetani, and who have kept it such throughout successive transplantings. The sequel of their researches will be awaited with special interest.

Correspondence.

DO BOVINES PERSPIRE?

SIR,—If Mr. Brett would only take the trouble to microscopically examine the skin of oxen, he would no longer want to rely on the authority of others, and he could prove conclusively that the views he now holds are as erroneous as his ignorance of bovine perspiration.

I am surprised that one having had such a long and extensive experience as Mr. Brett not being able to practically differentiate cutaneous respiration from perspiration.

I would suggest to Mr. Brett to study a series of cases of sweating seen in cattle; and then, no doubt, he will find that owners of animals and writers to medical journals do sometimes make use of "familiar expressions" that are scientifically correct.

Stratford, E., *April 8th.* HENRY GRAY.

INDIAN SKIN DISEASE.

DEAR SIR,—Would you kindly allow me to make the following corrections on my paper on the "Indian Skin Disease" as given in your March number:—

On page 157, in the third line from the bottom, read "sudoriferous" for "endorifous."

On page 161, in the 25th line from the top of the page, "cured in from four to fourteen days" should have been written, instead of "cured in fourteen days."

On page 162, in the 18th line from the top, for "spread" read "presence."

On page 162, in the 5th line from the bottom, for "being" read "been."

On page 165, in the 15th line from the top, for "large" read "small."

On page 166, as "7," "Constitutional treatment, when necessary," might be added. A. J. HASLAM, A.V.D.

Karachi, *March 27th.*

Communications, Books, Journals, etc., Received.

COMMUNICATIONS have been received from H. Gray, Stratford; R. Sturge, Ontario; R. J. Dawson, Essex; A. J. Haslam, Karachi, India; Professor Smith, Ontario; T. W. Spranklin, Baltimore; W. Penhale, Holesworthy; S. Villar, Harrow; L. Gooch, Stamford; A. W. Hill, London; R. Rutherford, Edinburgh; J. Adams, Warminster; J. A. Meredith, A.V.D., Mhow, India; P. R. Gordon, Queensland.

BOOKS AND PAMPHLETS: Bulletin des Séances de la Société Nationale d'Agriculture de France; *J. Wortley Axe*, Vesical Calculus; Critical Review of Professor Brown's Report on Eruptive Diseases of the Teats and Udders of Cows in Relation to Scarlet Fever in Man; *P. Mégnin*, Elevage et Engraissment des Vollailes; *G. C. Haubner*, Landwirthschaftliche Thierheilkunde.

JOURNALS, ETC.: *Journal of Dosmetric Medicine; Archiv fur Wissenschaftliche und Praktische Thierheilkunde; Deutsche Zeitschrift für Thiermedicin und Vergleichende Pathologie; Clinica Veterinaria; Repertorium der Thierheilkunde; Annales de Médecine Vétérinaire; Echo Vétérinaire; British Medical Journal; Recueil de Médecine Vétérinaire; Indian Medical Gazette; Lancet; Journal de Médecine Veterinaire et de Zootechnie: Journal of the National Agricultural Society of Victoria; Thierarzt; London Medical Record; American Live Stock Journal; Revue Vétérinaire; Edinburgh Medical Journal; American Veterinary Review; Live Stock Journal; Hufschmied; Mark Lane Express; Wochenschrift für Thierheilkunde und Viehzucht; Medical Press and Circular.*

NEWSPAPERS: *Homeward Mail; Montreal Herald; Surrey Gazette.*